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FREEDOM AND PSYCHO-GENESIS.

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There is a tendency in the thinking of the time to evade the question of the freedom of the will. Some excuse themselves for this neglect on the plea that the issue has become antiquated or exploded. But so long as the sense of responsibility for his actions survives in man, the question of freedom will remain central for him and his interest in its solution will be vital. We may assume then that neither the psychologist nor the metaphysician can waive the responsibility of its consideration.

Much of the perplexity that surrounds the question arises from the absence of any definite concept of the nature of the subject under debate. Usually there is in the minds of both the asserters and deniers of freedom a kind of vague apprehension that it is somehow inconsistent with the idea of law, and that a world of freedom would be virtually the same thing as a world of chance. To a mental state like this the alternatives are chance and fate, and the only escape from the iron clutches of an all-devouring necessity seems to be through a repeal of the law of causation and a plunge into 'primal eldest chaos.'

The dilemma which thus arises supplies a problem to the psychologist, although the source of the difficulty is partly extra-psychological and consists in the assumption that mechanical law or determination by other is the only conceivable type of orderly activity, and that it must be extended over human volition, unless we are prepared to regard the will

as lawless. The resources of psychology in dealing with the question are both direct and indirect. The direct method of approach is through the analysis of the activity of choice as it manifests itself in consciousness. If we separate this analytic business from all questions of the remote antecedents of choice and set ourselves to obtain as adequate an intuition as possible of the actual factors which enter into a present act of volition, we shall, I think, reach something like the following conclusion. In the first place the idea of motiveless choice, for us men, must be dismissed to the limbo of exploded philosophical myths. Motivation may be assumed as a universal law of choice, and the initial question will be to determine the mode of the operation of this law. Here we take the first step that lifts the issue above the plane of both fate and chance. Psychological analysis proves the immanent character of all normal motivation. Whatever relation the remote grounds of our actions may bear to us, the immediate determinants of choice and action must, in order to influence the will, become internal as parts of the energy that wills and chooses. Determination here is not external but internal. This conclusion taken in connection with two additional considerations will suffice to give a fairly adequate notion of the nature of the voluntary function.

One of these is the selective character of choice. True choice is always a case where one is taken and another left. There are, it is true, influential psychologists like James who regard ideomotor action, that is, immediate reaction upon presentation, as the type of all volition. Against this position the objection holds, I think, that it reduces all choice to immediacy and leaves no place for deliberation. But the choice that we mortals know most about is a mediate function which operates through selection of alternatives. And selection of alternatives involves a two-sided process, conscious annulment of ends as well as conscious self-commitment to the end that is chosen. The remaining feature of choice that is vital to it is the power of arrest which the mind is able, through its command of attention, to exercise over the forces that are impelling it to volition. Through this power of arrest the mind is able to effect a stay of the voluntary proceedings until it has

collected its scattered forces and is in a position to act as a unit. Thus, in what we may call normal choice the determining motive is the whole self that chooses,* while abnormal forms of choice would arise as departures and aberrations in various ways from this normal standard.

This is perhaps as far as the direct analysis of consciousness can take us in determining the nature of choice, but it is far enough to justify several important conclusions. The first of these is that the activity of will cannot be subsumed under the category of mechanical causation whose form is determination by other, but that in will we come upon a form of activity that is self-determining. We have seen that the immediate antecedent of choice, when it is normal, is the whole present self. In choice then the mind simply determines itself from one state to another. If we represent the two states by a and b and the activity of choice by x, every case of normal choice will involve the self-moving of the mind from a to b through function x. The causal antecedent of x is, therefore, the mind in state a, while the consequent is the mind in state b, and x is the activity or movement in which the transition is made. Normal choice is, therefore, self-movement and not movement by other. Another conclusion that follows from the above analysis is that fatalism rests on a false idea of the relation of a man to his own choice. The fatalist is one who denies his own agency in volition. The only type of determination, in his view, is determination by other. He, therefore, makes a false diremption between himself and the determining causes of his action and conceives himself to be a mere puppet in the hands of God, Nature, Fate, or whatever his Absolute may chance to be. But if the immediate antecedent of choice is the chooser himself, and if choice is self-determination, the presupposition of fatalism falls to the ground; for, however a man's choice may be determined, it cannot be that he is a mere spectator of the drama, or that he is run by alien forces that act without his own assent.

Self-determination is freedom: or, if we regard it as a type

* Two interesting discussions of the relation of motive to choice are Baldwin's—*Hand-book of Psychology*, Vol. II.: *Feeling and Will*, pp. 352-376; and Hodgson's—*Mind*, April 1891: *Free Will: an Analysis.*

of causation, it is free causation. That freedom is realized, therefore, in the form of volition is a psychologically verifiable fact. But in arguing the question we have distinguished the present act of will from its indirect antecedents and conditions. They are, however, never separate in fact, but the present choice is, in some sense, what it is, because of its antecedents. This changes the issue into a question of predeterminism. It may be demonstrated that the present choice is self-determined, and at the same time the self that chooses may be predetermined by its antecedents. We may thus escape fatalism and still find ourselves in the clutches of necessity.

It is clear that the issues involved in this phase of the question cannot be settled by an appeal to the individual consciousness. The problem of predeterminism is one that involves the factors of heredity and environment, and the point to be debated here is the relation of the present self that chooses to these predetermining agencies. At the basis of the inquiry rests the fact of a developing series the parts of which are bound together by the law of causation and all of which are, therefore, dependent on the chain in which they constitute individual links.

Now, the series with which the psychic nature of man is most completely identified is the biological. Man is a living being and his psychic activity is a species of life. This does not, however, reduce psychology to a branch of biology, but rather comprehends the biologic activity in that of the soul, just as the intelligence of the animal is comprehended in that of man. The term that is central in the biological series is the germ-cell out of which the organism develops and through which it propagates its species, and it is in connection with it that the bearings of heredity and environment need to be primarily estimated. Of the two factors, that of heredity is clearly the more fundamental, since it is through its agency that each successive environment is supplied with the special material upon which its modifying forces are to play.

How then are we to conceive heredity? It is clear that the germ-cell is the medium through which persistent effects must be produced. But at the very threshold of the inquiry into the nature of heredity, biologists have split into two con-

tending camps known as Neo-Lamarckians and Neo-Darwinians, the leader of the latter school being Professor Weismann, whose whole doctrine of heredity rests on the assumption, which is beyond proof, that the germ-cell out of which the organism develops, after it has separated from the parent organism and become fertilized, breaks into two parts, one of these developing into the new organism which is open to the modifying influences of the environment, while the other part remains unchanged as the germ of a future organism. Weismann, therefore, denies the modifiability of that part of the germ-cell through which the continuity of the species is maintained, and on this ground denies the transmissibility of acquired characters or modifications. Having virtually eliminated the environment as a factor in development, the Neo-Darwinians have three agents left: (1) new combinations of original characters which are effected through the modes of transmission, sexual or asexual; (2) accidental variations, or the appearance of characters which cannot be accounted for by the first cause; (3) natural selection which tends to eliminate all variations arising through the first two agencies, that are useless or injurious, and causes only those that are positively useful to survive.

Now, a careful analysis of these factors gives us the somewhat startling result that a whole class of variations, those that have no ancestral copies and on which development most directly depends, are left virtually unaccounted for. Darwin himself regarded variations in general as accidental; at least he brought forward no theory of explanation, while the Neo-Darwinians are able to account for some variations by new combinations of ancestral copies, but they have no adequate explanation for that large class of changes which the opposing school of biologists are in the habit of ascribing to the modifying influences of the environment.

It is because the Neo-Lamarckian school have command of all the Weismannian resources and are able in addition to fall back on the modifying activity of the environment as a cause of original variations, that their doctrine seems to possess a decided advantage over that of their rivals both as a theory of development and of heredity. They reject Weismann's

absolute isolation of the germ-cell of future organisms and hold that it is to some degree open to the modifying influences that affect the present organism in which it dwells. They are thus able to reach an idea of the development of organisms that is more flexible than the Weismannian, since the germ-cell is represented as fluent and open to all sorts of modifying influences; as well as more completely mechanical, inasmuch as the results are represented as arising out of a long series of almost infinitesimal changes produced by the varying play of environing forces.

The functions of heredity and environment will be most adequately conceived when considered in their relation to the germ-cells out of which the successive organisms develop. We have in the germ-cell a biological unit which contains the stored-up potence of a developed life, there being included in this unit as part of its potential, the accumulated modifications of a series of antecedent environments. And this unit containing the results of past modifications is to be conceived as continuing susceptible to all the modifying influences that affect the parent organism in which it is latent as well as to the more effective agencies which play upon it after it has become the active germ of a new organism.

The history of the living organism may be taken as including that of the mind; for whether we regard the mental as involved in the original potence of the germ-cell, or as superinduced upon it at some stage of its development, in either case its fortunes will be cast in with the biological unit with which it is associated and through this connection it will be vitally affected by all those hereditary and environing conditions which influence the organism. Professor Orr in his work entitled *A Theory of Development and Heredity* has made a very interesting contribution to the psychology of the hereditary and environing forces. His contention is that the nervous system stands as a necessary medium between the environment and the living organism, translating the forces of the former into nervous energy, in which form it becomes the working agent in every part of the system. Now, the nervous force builds the organism, especially on its functional side, by means of two psychological laws; namely, repetition and asso-

ciation, and Professor Orr shows in several chapters of his book how in the sphere of psychic activity the operation of these laws leads to the development of habitual responses to the forces of the environment and how these tend to become ingrained in the nervous tissue and to be transmitted by heredity as the organized physical basis of instinct and mental habits.

The logical import of such considerations as these seems on first sight to be the suppression of freedom and the re-instatement of strict mechanical necessity, and this is the conclusion drawn by physiological psychologists like Dr. Maudsley and Professor Ziehen, who dismiss freedom as pure illusion, asserting the connection between choice and its antecedents to be essentially the same as that between a physical cause and its effect. It would be useless to deny that from the common point of view these conclusions are not without some reasonable grounds. If the will of man is strictly predetermined by its antecedents; if its choices are but links in a chain of mechanical causation, it would seem that the fact that the form of choice is self-determination loses most of its value, and I am unable to see how a libertarian could continue to fight for it with much stoutness of heart. But the irony of the situation arises here in the fact that at this point the investigation is usually dropped and the inquirer goes his way thinking he has solved the problem. As a matter of fact he has only succeeded in stating some of its data and the solution is yet to be achieved. In the preceding investigations we have simply been getting at the two sides of our problem. We have demonstrated two conclusions. The first is that all choice is self-determination; that normal choice is the unimpeded and full expression of the individuality of the chooser. Nothing that we have discovered since has overthrown that conclusion. It still holds that man himself chooses and that his choice is not a function of some external necessity. The second conclusion demonstrated is that this self that chooses belongs to a mechanical series and has been helped to its present position by the forces of heredity and environment. Choice is self-determined, but the chooser is predetermined through heredity and environment.

We have to deal then with the two factors, mechanism and self-determination. Any freedom that is open to man must include both. It is clear that if freedom and mechanical causation are mutually exclusive terms, freedom for man is a chimera. Mechanism cannot be expelled from his activity, but is inseparable from its highest equally with its lowest phases. The freedom that is open to man must be one that can be realized through and in connection with mechanism. Is any such freedom possible? In seeking an answer it is to be noted in the first place, that the problem of freedom in this larger sense could only arise to a consciousness that had stumbled upon a dualism and had been brought face to face with the alternatives of a higher and a lower self. When the actual consciously faces the ideal whose claim to legislate for it by imposing upon it a law of duty, it recognizes, the question will inevitably arise as to the practicability of obeying the law of the ideal and realizing the higher life which it enjoins. This was the issue as it presented itself to Kant, and in his attempt to solve it he committed what seems to me to be his gravest theoretic mistake. Kant proceeds on the assumption that the ideas of mechanical causation and freedom are mutually exclusive and that the same system of reality cannot contain both, and he thinks, therefore, that in order to establish the reality of freedom it will be necessary to show that outside of the bounds of mechanism there is a sphere of psychic activity that is unaffected by mechanical conditions. The only conclusion Kant could reach from such grounds was the one he actually drew; namely, that while there may possibly be a transcendent region in which such activity is conceivable, yet so far as actual experience goes we never get beyond the reach of mechanical influences.

This conclusion is instructive not only as to Kant's state of mind, but also as revealing the morass in which so many contemporary thinkers are still floundering. Kant's trouble arose from the fact that while he had a very keen intuition of the mechanical conditions with which the mental life is begirt, he had scarcely any notion at all of psycho-genesis. Otherwise, those forces which seemed to him only to bind and circumscribe would have appeared in a new light as conditions of develop-

ment. As it was, Kant could only sit and wring his hands and wish that the universe were different from what it is, until in a happy moment it was borne in upon him that the difficulty might be overcome by tagging freedom on to the end of a moral postulate. But this, at the best, turns out to be a sort of device by which morality may comfort itself, the actuality being different. It is not open to the contemporary thinker who has become disillusioned on this point to betake himself to the Kantian refuge, and it has not occurred to him, as yet, to apply the genetic idea to the question of the relation between mechanism and freedom.

The most pregnant application of the genetic idea to the basal problems of psychology that has ever been made is that of Aristotle. It arises through his translation of the ontologic ideas of Platonism into the formal principles of individual things, and his conception of these forms dynamically, as activities which tend to unfold from a mechanical state of mere potence or capacity toward one of actuality or a state of self-activity. This view is involved in his treatment of the three categories, *Δύναμις*, *Ἐνέργεια*, and *Ἐντελέχεια*. *Ἐνέργεια* is the category of self-activity in its absolute form, while *Δύναμις* and *Ἐντελέχεια* stand as a pair of correlatives which together embrace nature and relativity. They also represent the opposite poles of a process in which nature is conceived as passing from a stage of matter, or pure mechanical response to external impulsion, to that of soul, in which mechanism is subordinated to the form of self-activity. Soul, in Aristotle's view, is the climax of nature and embraces in its constitution a synthesis of passivity and actuality. This appears in his definition of it as the 'first Entelechy' of a body that has the capacity of life. The fine point of the definition is apprehended only when the dual significance which Aristotle attaches to the term *Ἐντελέχεια* is kept in mind. This term, as he uses it, is a sort of watershed between potence and actuality, giving a reminiscent look toward mechanism as well as a prospective glance toward the self-activity of spirit. Soul, then, as the first entelechy of a potentially living organism, is to be conceived at any and every point of its life as embracing a synthesis of polar moments, passivity

and activity, potence and actuality, and this synthesis may be regarded as grounding the relations which arise later between the categories of mechanism and spirit, determination by other, and free self-activity. But this is anticipating. Again, Aristotle's definition connects soul with life as a form of its actualization. The highest form of life is soul. This is Aristotle's doctrine. It escapes the dualism of the theory that soul is a distinct principle introduced into the living organism, and plants itself firmly on the ground that life is one, that it is not completely actualized, and that it does not reveal its true and complete nature, anywhere else than in soul. But the point of vitalest interest in connection with the special theme of this paper is the fact that Aristotle's conception of soul and its relation to life enables him to incorporate the principle of development into its very constitution in such a way that it can no longer be adequately represented under static categories. And it is here that the Aristotelian conception of the soul seems to me to furnish a much more adequate and effective basis for psychology than that of Herbart-Lotze, for example, in that it shows more clearly how the genetic method may be grounded in a real principle of psycho-genesis.

I mean by a real principle of psycho-genesis one that not only grounds development as a constitutional law of the psychic life, but also supplies some definite notion of what *psychic* development means. The Aristotelian concept helps to the formation of such a notion in this way. It asserts, not simply that soul-life is a development, but that it is a development of a particular species; namely, of a principle of self-active consciousness, from a state of potence or mere capacity up to a state where all its powers shall have become actual and its nature completely revealed. The nature of the psychic principle and the species of its development are thus to be determined in view of their outcome. If the actualized result is a self-active and self-determining consciousness, then we have the right to say, on the Aristotelian principle, that it was potentially that from the start, and that in every stage of its evolution it was going on to be just that. And without raising any question of transcendent teleology or design, we see how the process is immanently teleological from the beginning.

The value of the Aristotelian insight will be manifest in view of the fact that the two most pregnant ideas in the domain of psychology to-day are these of psycho-genesis and the immanent teleologic character of consciousness. The tendency of the one is to modify static conceptions and to view the soul-life as fluent and progressive; that of the other is to shatter the hard front of mechanism and to reduce it to the position of a servant to a teleological process. The Aristotelian insight enables us to ground these categories in the very constitution of the soul itself. So that when we find consciousness to be a selective principle which is everlastingly in pursuit of ends even when it does not know itself to be teleological, we can rationally ground the discovery in a doctrine of the nature of the soul as a self-active principle whose law is development from mere potence into the actuality of a self-conscious and self-determined life.* And when we find in consciousness a dualistic dialectic between an empirical will and an ideal which utters itself in conscience, we are able to trace this dialectic to the teleological law of psychic development, which is the law of the immanent ideal activity that the psychic process is ever going on to actualize.†

We conclude then that all psychic activity is in its essential nature teleological. What it actually is or realizes, never truly or completely expresses its nature. But its real character only comes out in the light of what it has in it to become, or what it is going on to be. Now in the light of this we ask why freedom should not be teleologically construed. In the former sections of this paper we demonstrated two conclusions; namely, that normal choice is a form of self-determining activity, and that in its connection with heredity and the environment, the self that chooses belongs to a causal series and is predetermined. In view of current modes of thinking the last conclusion seemed to swallow up the first and to leave the life of man in the clutches of necessity. But when

* The Aristotelian idea of soul thus seems to supply a rational basis for James's doctrine of the selective character of consciousness.

† I do not mean to assert that conscience is completely explained as the immanent ideal of the soul. In my work on 'Basal Concepts in Philosophy' I seek to show the relation of immanence to the transcendent. The point here is that conscience on its psychic side utters the immanent ethical end of the soul.

in the light of later conclusions we claim the right to put a teleological construction on the whole process, the clutch of necessity seems to be loosened. For the developing series then acquires a meaning outside of the mere determination of consequents by antecedents. Instead of a soulless corporation, it becomes animated with spirit, and we see that what has outwardly the appearance of dead mechanism becomes a fluent and living organism whose whole significance is the immanent potence which it contains and the immanent end or ideal which it is going on to realize.

It is clear that from the teleological point of view, whose justification has been shown to spring from a profound view of the nature of psycho-genesis, mechanism becomes the handmaid of teleology, and while it conditions, also furthers the immanent end. Heredity conserves the end by preserving and transmitting the gains of individual experiences, while the environing forces supply the necessary stimuli of development. And when we apply these considerations to the problem of freedom it becomes clear that the moment we subordinate mechanism in general to teleology, we thereby subordinate mechanism also to freedom. And instead of standing by and wringing our hands because predeterminism swallows up freedom we may go on our way rejoicing, since our new insight enables us to see that nothing of the sort happens, but that free self-determination is the end which all this hard and forbidding-looking mechanism has had at heart and has been realizing from the beginning. For, just as the end subordinates the means, so freedom subordinates the mechanical agencies through which it is achieved.

There is no reason why psychology when it has committed itself to the genetic idea should stubbornly persist in construing freedom in some absolute sense which is above man and then deny its existence because it is inconsistent with the mechanical conditions of human life. Why should not freedom be construed in harmony with development, and why should it not be teleologically conceived? The questions supply their own answer. The teleological idea of freedom is the only one that a genetic psychology can consistently entertain. For, to genetic psychology conscious activity *is* teleologic activity, and volition is the type of conscious activ-

ity on the practical side. Volition is self-determining activity, as we have seen, and self-determining activity is free activity. If free activity is the outcome of mental development and this outcome is the immanent end and meaning of the process, the conclusion naturally follows that the development only achieves its complete reality in freedom.

Now, if we identify freedom with self-activity and construe it teleologically, there are several senses in which the term may be used in its relation to mental development. As potence or capacity for self-activity, it will be a condition of development. As actual self-determination it will be the form of all normal choice; whereas, as the self-determination of the ideal it will be the end toward which development is tending but which it never realizes. But in each and all of these senses its vital relation to experience is evident. Freedom is not a speculative will-o'-the-wisp, but it is something that, in the words of Bacon, concerns 'men's business and their bosoms' in that the possession of it is the condition of their being men, while the realization of it is the great end of rational and spiritual activity.

The doctrine of freedom here developed has also another merit. It supplies a rational ground of distinction between the normal and the abnormal in the sphere of choice. Freedom can be postulated without qualification, only of normal choice. The normal function of heredity and environment is the development of free activity. In other words, the normal is the good. The abnormal will enter as some kind of evil or aberration from the normal standard, and while it will be negative, it will be also real. The abnormal will become a factor in both heredity and the environment, and it will operate as a kind of loading of the dice, and in the development of predispositions to evil, in diminishing and thwarting and turning aside the forces of development. The abnormal will embody itself in organic and functional defects, in ingrained hereditary evil tendencies, in environments which hinder and clog progress. The abnormal thus supplies a special problem to the psychologist as it does also to the moralist and the jurist. But to the psychologist as well as to the moralist and the jurist a correct diagnosis of the normal is a necessary condition of the rational treatment of the abnormal.

THE CASE OF JOHN BUNYAN. (III.)

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V.

The malady was now, after the passage of this acute stage, all the more certainly in possession of the man. The temporary remission was sure to prove deceitful. In Dr. Cowles's patient after once the morbid habits had become systematized, to a degree similar to the one now reached in Bunyan's case, there was apparently no way out of the gloomy labyrinth. Whatever devices were tried led, so long as the patient was under Dr. Cowles's observation, to renewed struggles with conscientious scruples and with ingeniously subtle inner temptations, and the sufferer, whatever her temporary stages of relief, was doomed to walk round and round the charmed circle of doubt, of temptation, of elaborate self-invented exorcising devices, of failure, of self-reproach, and of despair. It was to be Bunyan's good fortune to escape in the end from his tempter. How he was thus to escape, the next and most agonizing of his acute stages was to determine. The sufferer from such morbid systems is at best, as all the evidence shows, in a very serious position. That very strength of certain of his highest brain-functions which is one condition of the development of his weakness as to other functions, makes all the harder the task of teaching him wholly new mental habits. Yet without such wholly new habits he can never escape. Hence the evil prognosis which most observers now unite in attributing to this type of disorder, viz., to the chronic malady of insistent impulses with intercurrent acute stages. But there is one rather desperate chance which most writers on the subject

have, as I think, generally neglected. Suppose there appears, in the life of the chronically affected patient, a new insistent impulse, such that yielding to this particular impulse brings the patient into some wholly new relation to his environment. Suppose, thereupon, that a novel and profoundly different life, even if this be a very painful life, is forced upon him in consequence of his yielding. The result may be a condition of things in which, diseased though he still is, the old cares and temptations are entirely set aside by the fresh experiences given through the new environment. If the patient has now strength enough to bear the pangs and the fresh and strongly contrasted nervous distresses of this changed life, he may actually have time to reform his mental habits before the old 'tempter' is able, for his part, to organize his own inimical nervous tendencies upon the new battle-field. The substituted pangs themselves may then pass before the old are renewed. Then indeed, some day, the old enemy will come back, but the patient will have become, meanwhile, another man, and the whole system of his formerly insistent opponents will have been broken up. He will thus find himself thrown back, in some sense, to the earlier stages of his own case; he will once more have only elementary doubts and fears to oppose. But these his experience will have taught him to circumvent; and so, at any rate with a certain degree of defect, he may have become cured. The elements will survive, but will no longer systematize.

This possible good fortune, to be won, if at all, by passing through the fiercest fire of painful impulse, Dr. Cowles's patient tried in vain to find, when she experimented at pretending to poison herself, or, later, deliberately wounded herself with a pistol, not hoping to commit suicide, but only seeking to expiate her faults, and to get peace from her tempter, through novel pangs. Bunyan, without dreaming of such relief, actually won it through what seemed, at the time, the most hopeless of all the woes that had yet beset him.

"For after the Lord had, in this manner, thus graciously delivered me from this great and sore Temptation . . . the Tempter came upon me again, and that with a more grievous and dreadful Temptation than before. And that was, *To sell*

and part with this most blessed Christ, to exchange him for the things of this life, for anything."

The new temptation had its own typical mental context, different from that of the previous stage. This was now no single member of a 'flood of blasphemies.' It stood nearly alone, as equivalent for all the rest of the earlier temptations. Still, however, the impulse to *sell Christ* was merely an imperative motor speech-function. No other word seems ever to have substituted itself for the word *sell*; and the only further act involved in yielding to the temptation was a purely formal inner assent to the 'selling.' The proposed transaction involved, as a matter of course, no actually conceived exchange whatever. Nevertheless, in a most interesting fashion, the imperative impulse now appeared as a reflex, which tended, in consciousness, to enter into a sort of 'agglutinative' combination (to use one of Wundt's well-known adopted phrases), with any object of passing perceptive interest; so that the special form of the experience was that the tempter moved Bunyan to *sell Christ for this* or *for that*, whatever the insignificant thing might be that Bunyan was at the moment attending to, or handling, or dealing with in any active way. The painfulness, the associated fear, and the violence of the thought, were all of the most intense sort; and this reflex character made the temptation infect Bunyan's whole life most horribly; "for it did always, in almost whatever I thought, intermix itself therewith, in such sort that I could neither eat my food, stoop for a pin, chop a stick, or cast mine eye to look on this or that, but still the temptation would come, *Sell Christ for this*, or *sell Christ for that; sell him, sell him.*"

The struggle this time very soon led Bunyan to that grave stage where the sufferer from insistent impulses resorts to apparently senseless motor acts that possess for him an exorcising significance. "By the very force of my mind, in laboring to gainsay and resist this wickedness, my very body also would be put into action or motion by way of pushing or thrusting with my hands or elbows, still answering as fast as the destroyer said, *Sell him; I will not, I will not . . . no, not for thousands, thousands, thousands of worlds.*" This kind of elaboration rapidly grew to its own hopelessly extravagant extremes. But

in vain. A few added doubts, of the old inhibitory type, meanwhile appeared in the background, but the tempter had now, so to speak, learned his game, and had no need to waste his forces upon general devices of inhibition. This one suggestion was enough. The loathsome triviality of the motor impulse itself, in its pettiness, and the vast dignity of the eternal issues imperilled, as Bunyan felt, by its presence, combined to give the situation all the dreadful and inhibitory features that had earlier been spread over so wide a mental range of evil interests.

"But to be brief, one morning, as I did lie in my bed, I was, as at other times, most fiercely assaulted with this temptation, . . . the wicked suggestion still running in my mind, *Sell him, sell him, sell him, sell him,* as fast as a man could speak. Against which also, in my mind, as at other times, I answered, *No, no, not for thousands, thousands, thousands,* at least twenty times together. But at last, after much striving, even until I was almost out of breath, I felt this thought pass through my heart, *Let him go, if he will!* and I thought also that I felt my heart freely consent thereto. Oh the diligence of Satan! Oh the desperateness of man's heart!"

"Now was the battle won, and down fell I, as a Bird that is shot from the top of a tree, with great guilt, and fearful despair. Thus getting out of my Bed, I went moping into the field; but God knows, with as heavy a heart as mortal man, I think, could bear; where, for the space of two hours, I was like a man bereft of life, and as now past all recovery, and bound over to eternal punishment."

VI.

The nervous crisis thus passed served to introduce a condition of extremely lengthy, quasi-melancholic, but to Bunyan's consciousness wholly secondary, depression. The hopeless sin was committed. Like Esau he had sold his birthright. There was now 'no place for repentance.' This, the third stage of the culmination of the malady, was marked by an almost entire quiescence of the insistently sinful impulses; for what had the victorious tempter now left to do?

There were no more minor hesitancies, no loathsome motor irritations. One overwhelming idea and grief inhibited all these inhibitory symptoms. The insistent associative processes with the scripture passages became, however, for a good while, all the more marked, automatic, and commanding. Thus the whole mental situation was profoundly altered. The secondary melancholic depression expressed itself occasionally in precordial anxiety. "I have felt also such a clogging and heat at my stomach, by reason of this my terror, that I was, especially at some times, as if my breast bone would have split asunder." But Bunyan even now never long lost his dialectic skill; and hopeless as seemed his case, he from the first set about trying to think of a way of escape from destruction, being throughout 'loath to perish,'—a fact which, viewed in its results, indicates the relative intactness of his highest mental functions amidst all his gloom.

Except for the automatic processes with the scripture passages, Bunyan's condition of secondary melancholic depression had, therefore, despite its depth and its fantastic background, many of the more benign characters of normal grief. It had, at the worst, its occasional remissions. It left his reasoning powers formally unaffected. And it had the painful but really invaluable character that, just because his fate seemed decided, he had a long and almost total rest from the irritating motor processes, whose dependence upon his past habits of conscientious anxiety is thus all the more confirmed. For this restless anxiety, the pretty steady assurance of damnation was now substituted. This, as the event proved, Bunyan's heroic disposition was strong enough to endure, despite the 'splitting' sensations in the breast, despite the long days of grief and of lonely lamentation; despite his inability to get any comfort or help from his few advisers. The case was still grave enough, but this light melancholia proved to be a decidedly kinder disorder than the foregoing one, and it led the way over to recovery.

In the long tale which follows, in Bunyan's Autobiography, and which is largely devoted to the description of the inner conflicts amongst the scripture passages (of whose automatic evolutions poor Bunyan's consciousness was now long the

merely passive theatre), there are but few things further to be noted for our purpose. But these are extremely instructive.

The gradual emergence from despair is obviously due, on the whole, to the *vis medicatrix naturæ*. Bunyan's general physical health gradually improved. His conscientious habits of life, freed now from the tempter's teasing interferences, had a chance to become healthily fixed and unconscious. He grieved too deeply to long for distractions, and never thought of returning to his youthful sins as a relief from despair. The doubts and other motor inconveniences were of course still in the background of his mental life, but it is interesting to note how, whenever they appear, they are now simply overshadowed and devitalized by the fixed presence of the ruling melancholic ideas. The tempter is thus at length known as a relatively foreign and mocking other self, whose power over Bunyan's will grows less even while his triumph is supposed to be final. He 'becomes humorous,' as Froude observes. Bunyan, so the tempter suggests in his old metaphysical way and with the old doubting subtlety—Bunyan had better not pray any more, since God must be weary of the whole business; or if he must pray, let it be to some other person of the Trinity instead of to the directly insulted Mediator. Could not a new plan of salvation be devised by special arrangement, the Father this time kindly acting as mediator with the otherwise implacable Son, to meet Bunyan's exceptional case? But such suggestions, which in an earlier stage would have been 'fearful blasphemies,' now have to stand in contrast to the fixed and central grief which constitutes Bunyan's own personal consciousness. Bunyan knows by the very contrast that these suggested words of the tempter are *not* his own. This is the mere fooling of the exultant devil. It is meaningless. For Bunyan is consciously on the side of the grief itself, and the humorous tempter is the sole owner of the blasphemies, which therefore serve all the more to 'confirm' the sufferer in his painful faith. A better device than this for the 'segmentation' of insistent questionings could not have been imagined by any physician learned in the cure of souls. The victorious tempter had unwittingly dug his own grave. He could never again get possession of this man's central

self, nor use this brain as a foundation for systematized evil habits.

Another instructive aspect of the slow process of recovery lies in the fact that Bunyan was, towards the end, able, at some moments and despite his always busy dialectic processes, to win that attitude of complete resignation, of abandonment of all feverish conscious strugglings and pleadings with fate,—that attitude which, as experience shows, is so often the beginning of a final recovery from all forms of deeper mental distress. Such an attitude is consistent, as it was in Bunyan, with a good deal of cool consideration, and with much activity of thought, but it was still effectively assumed. There is, for such sufferers as Bunyan, and for many others, a mood of gentler despair that is often essentially healing, because, as compared to their old feverishness, it is peaceful. It is the sort of despair that Edgar Poe has put on record in the admirably psychological lines 'For Annie.' It is the mood that says, to the tempestuous striving self of former days, '*Ich hab' meine Sache auf Nichts gesetzt.*' One is lost; only eternal mercy can save; one finally is content to leave all to fate or to God, and to 'lie quietly,' like the conscious corpse of Poe's poem, glad a little that the 'fever called living is ended at length.' Bunyan is remote enough in type from Poe's lover; and he was never content long to lie quiet. But still, at moments, this essentially curative element also is present in this stage of his experience. The automatic play of the remembered scripture passages became with him more and more complex, imposing, unpredictable,—an inner fate that he often helplessly watched as one watches the breaking of great waves on the beach. Plainly God must be directing the process. Bunyan could only pray that God's will might be done, and hope that so many kind glimpses of light would not have been shown to an utter outcast. 'God and Christ,' he says, 'were continually before my face,' and, painful as the experience was, since he was facing his judge, this kept down, as he himself recognizes, all the old temptations to 'atheism.' At last "I saw . . . that it was not my good frame of heart that made my Righteousness better, nor my bad frame that made my Righteousness worse; for my righteousness was Jesus Christ himself, *the same yesterday, to-day, and forever.*" And 'now,' he says,

in narrating this last experience, 'did my chains fall off my Legs indeed.' Such is the healing virtue of true resignation.

The episodes of this whole long final stage were of course numerous and of Protean character. There was throughout, despite the prevalence of the general despair, considerable instability of mood. Intervals of peace, resulting from this or that 'sweet glance' of a 'Promise,' alternated with the wildest fits of gloom. Two or three times the borderland pseudo-hallucinations of speech returned. Once, in particular, at a moment of this sort, the accompanying experience of calm "made a strange seizure upon my spirit; it brought light with it, and commanded a silence in my heart of all those tumultuous thoughts that before did use, like masterless hell-hounds, to roar and bellow and make a hideous noise within me." And this sudden transformation of mood, produced by a comforting voice that was 'as if heard,' was so great that, many years later, though writing in a very cautious and self-critical spirit, Bunyan could not refrain, in a later edition of the *Grace Abounding*, from inserting this incident, and adding his private opinion that this might indeed have been 'an Angel' that 'had come upon me.' Yet no element of actual delusion was, at the time, involved in the experience. As for the scripture passages, their automatic effects were such that Bunyan ere long found himself awaiting with interest what would happen when two, already known and often studied 'words' should, by chance, 'meet in my heart'—an event which might prove to him of the most critical importance, although, beforehand, he could do positively nothing to hasten or to effect this event by any voluntary consideration of the passages. Only when the suggested passages were numerous, and the 'meeting' had already often occurred, could he devote himself, with his accustomed dialectic skill, to considering with care the outcome and its meaning—a thing which, just before his recovery, he learned to do, in some cases, very coolly and with great deliberation.

The passing of this stage of despair was attended, at the end, with many of the usual exaltations and confusions of convalescence. "I had two or three times, at about my deliverance from this temptation, such strange apprehensions of the grace of God, that I could hardly bear up under it; it was so

out of measure amazing, when I thought it could reach me, that I do think, if that sense of it had abode long upon me, it would have made me incapable of business."

VII.

The cure had come to pass, but it was, and remained, a cure with a pretty well-defined defect. The tempter could never again obtain control. The diseased habits were reduced to their elements, and were unable to systematize themselves afresh. The elements, however, proved, as one would expect in such a case, too deeply founded in this wonderful constitution ever to be eliminated. At the end of the *Grace Abounding* Bunyan, with the simplest humility, records the temptations to which his soul is now permanently subjected. His moods of spiritual interest and emotion are to a very considerable extent unstable, do what he may. There are times when he is 'filled with darkness,' however much, at other times, he may have been exalted. His heart becomes, at the dark times, 'dead and dry,' and he can then find no 'comfort.' He is also still occasionally tempted 'to doubt the being of God and the Truth of his Gospel'; and this is always the 'worst' of moods. Furthermore, in his preaching, the tempter often besets him 'with thoughts of blasphemy,' which he is 'strongly tempted to speak' 'before the congregation'; or again, a strange confusion of head comes upon him as he preaches, and straitens' him, so that he feels "as if I had not known or remembered what I have been about, or as if my head had been in a bag all the time of the Exercise." More subtle assaults of the tempter also come while he preaches,—condemnations of this or that which he knows it to be his duty to utter, or on the other hand movings 'to pride and liftings up of heart.' For a while after his malady, when he had joined the church, he was tempted to blaspheme during the sacraments. In any of his illnesses, peculiarly black and cowardly thoughts always come. At the beginning of his imprisonment he long felt himself to be a hopeless coward, unable because unworthy to suffer for the faith, and the tempter mocked this weakness with all the old subtlety.

But now—here is the important thing—all these perma-

nent enemies are still, and remain for the rest of Bunyan's life, in no wise uncontrollable. His deeper consciousness is beset, but never overwhelmed, by them. His attitude towards them becomes objective, resigned. They teach him to 'watch and be sober.' They are useful to him, since 'they keep me from trusting my heart.' Of one of his later hours of darkness he says: "I would not have been without this Trial for much. I am comforted every time I think of it, and I hope I shall bless God forever for the teaching I have had by it. Many more of the dealings of God towards me I might relate, but these, *out of the spoils won in Battle have I dedicated to maintain the house of God.*" The words are typical of all the later inner experience of Bunyan; and it is to this spirit in the man that we owe his immortal works.

Of his mental regimen after his recovery a word may yet be said. A wise instinct guided the much-tried wanderer in the darker world to forsake henceforth his solitude, to join himself 'unto the people of God,' to try to be objectively serviceable, and to keep in touch with the needs of his brethren. His gift of speech hereupon soon discovered itself. He was ere long set to preach. His power won multitudes of listeners during all his years passed out of prison. In prison he wrote busily, and preached to his fellow-prisoners at every opportunity. The motor speech-functions, whose inhibition had led to such disastrously rebellious insistent habits, were never again suffered to remain without absorbing and productive exercise. The decidedly healthy self-contempt engendered by the experience of his own weakness only served to make him more objective in his whole attitude towards life. Henceforth he knows every man to be of himself naught. He has therefore, as Froude points out, no favorites, and portrays, in his literary work, Talkative, and Ignorance, and Mr. Badman, with as much cool devotion to the task and with as much artistic faithfulness, as Christian. He spares no one, himself least of all. Yet he sympathizes with every manner of human weakness, for his own inner life has furnished him with a brief abstract and epitome of all human frailty. His mastery is the mastery of the genius who has really entered the Valley of the Shadow and has passed through. Hence the seeming of the man in the eyes of those who knew him in later life, and who

could not easily have suspected, in this modest yet commanding presence, the piteous weaknesses of his younger years, had he himself not so instructively told the wonderful story.

Our result can be briefly stated. This is unquestionably a fairly typical case of a now often described mental disorder. The peculiarities of this special case lie largely in the powers of the genius who here suffered from the malady. A man of sensitive and probably somewhat burdened nervous constitution, whose family history, however, so far as it is known to us, gives no positive evidence of serious hereditary weakness, is beset in childhood with frequent nocturnal and even diurnal terrors of a well-known sort. In youth, after an early marriage, under the strain of a life of poverty and of many religious anxieties, he develops elementary insistent dreads of a conscientious sort, and later a collection of habits of questioning and of doubt which ere long reach and obviously pass the limits of the normal. His general physical condition meanwhile failing, in a fashion that, in the light of our very imperfect information concerning this aspect of the case, still appears to be of some vaguely neurasthenic type, there now appears a highly systematized mass of insistent motor speech-functions of the most painful sort, accompanied with still more of the same fears, doubts, and questions. After enduring for a pretty extended period, after one remission, and also after a decided change in the contents of the insistent elements, the malady then more rapidly approaches a dramatic crisis, which leaves the sufferer for a long period in a condition of secondary melancholic depression, of a somewhat benign type,—a depression from which, owing to a deep change of his mental habits, and to an improvement of his physical condition, he finally emerges cured, although with defect, of his greatest enemy—the systematized insistent impulses. This entire morbid experience has lasted some four years. Henceforth, under a skilful self-imposed mental regimen, this man, although always a prey to elementary insistent temptations and to fits of deep depression of mood, has no return of his more systematized disorders, and endures heavy burdens of work and of fortune with excellent success.

Such is the psychological aspect of a story whose human and spiritual interest is and remains of the very highest.

A STUDY OF FEAR AS PRIMITIVE EMOTION.

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It may be considered as plausible that if the first feeling was pain (see *Philosophical Review*, vol. I. p. 433 ff.), the first emotion was also of the pain character. The first representation of an object as painful induced that reaction of mind which we term an emotion, and the painful emotion we call fear. That the first emotion to appear was fear, as fright, seems likely when we consider that the general alertness and defensiveness imperatively required in the struggle for existence is thereby most immediately and simply attained. The acquirement of the power to become frightened is plainly a most important requisite for self-preservation, and thus is indicated as a very early factor in conscious life. An animal being devoured by another may merely suffer pain without any perception of the object as pain-giving and to give pain; but if it attains this perception, there may be added to the stimulus of simple pain, that of fright. The direct actual pain may be but small, and so inducing but feeble reaction, as when some less sensitive portion is being injured; but if there occurs a vivid representation of potential pain, fright happens and stimulates most strenuous endeavors, and so rids the animal both of the immediately and the prospectively painful. Thus emotion acts as a complement to simple feeling, and also secures practically anticipatory reaction. Animals which must receive actual injury before experiencing pain are clearly inferior to those which experience emotion-pain before the injury is actually received. Other things being equal, the most easily frightened have, in the midst of many destructive agents, the best chance of survival and of perpetuating their kind.

It is unnecessary to dwell at length on child life and savage life as illustrating the primitive quality and function of fear. The earliest experiences of the child with things are lessons of fear. The burnt child dreads the fire, and thus is enabled to preserve himself from threatened injury. Fear is a primary and most important motive to action in a very wide range of the lower mental life. Those who have observed animals and man in a state of nature are always greatly impressed with the constant and large part which this emotion plays in their consciousness. With the timid and weaker species, like the rabbit and squirrel, it is likely that a majority of their cognitions prompt to fear or are prompted by fear, and with some persecuted races of savages the same may be said.

The necessity and value of anticipatory reaction being acknowledged in the struggle of existence, we plainly see a primitive motive thereto in fear, and the earliest emotional life which we can clearly interpret likewise seems to be fear.

It is sufficiently easy to see the general function of fear and its primitive character, but we find it very hard to make a satisfactory analysis, and to show the exact steps of its evolution. It is obvious, however, in the first place, that fear like other emotions is purely indirect and secondary experience; it presupposes previous painful experience of the feared object. Pain experienced in connection with cognition of object is the basis of all fear. Animals that have not felt pain from man do not fear him. But fear while thus based on previous direct experience is always hindered by simultaneous direct experience, as, for example, sensation. Thus when we, whip in hand, say to a child crying from fear, 'I will give you something to cry for,' we imply the law that direct pain and sensation tend to supplant indirect feeling as emotion. This common expression emphasizes the essential representativeness of emotion, its imaginary nature, as also the supplanting power of direct real experience. The sight of the whip inspires fear in the child who has been whipped, but this fear is in the course of a punishment wholly eliminated by the direct pain endured. The direct experience is thus the basis of every fear, but only as it is cognized, and not felt.

The great difficulty in analyzing fear is in clearly appre-

hending the mode in which previous experience is utilized. If we could study in ourselves the genesis of a simple emotion we should doubtless be enabled to see the steps by which experience reacts upon itself so as to give a reflex form like the emotion of fear, but this is hardly possible. However, cognition is evolved at the instance of pain, and all objects are viewed not for themselves but in their feeling significance. Cognition is imbedded in feeling, and at first is a mere tone of feeling. Things are not at first known for themselves but solely as sources of pleasure and pain. Things are perceived in and through the feeling which has stimulated the perception. The immediate feeling value of the object is given by the very origin and process of cognition. When an animal is pained by contact with a sharp rock and this pain stimulates cognition of the rock, this is solely on the pain account. Repeated experiences enable the percept to arise at stimulus of less and less pain, and so the proper reaction is accomplished more and more economically.

But how does perception of object appear before any experience of pain from it? How is pre-perception of object in its feeling value accomplished? In emotion as of fear we have cognition attained before the paining and as sign of paining, a wholly premonitory function. But how can in any case the object be perceived before it painfully affects the perceiver? How does mind become conscious of a thing whose painful effects it is not at the time receiving?

Emotion certainly seems the reverse of primary cognition which comes only by stimulus of present pain from the thing, whereas the emotional form includes cognizance of objects before they affect consciousness in pleasure and pain mode. Simple primary cognition arises from the pain; in later forms, on the contrary, cognition conveys impression of the object's pleasure-pain quality, and there results the peculiar disturbance we term an emotion. Instead of rock causing pain before cognition of the rock is accomplished, cognition of the rock, in the emotional stage, causes a painful feeling, emotion of fear. The feeling is here sequent and result of cognition, and not *vice versa.*

How pre-perception of object—that is, perception before in

any given case there is direct pleasure-pain experience of it—is gained, can only be determined by an analysis of the way in which representation has been built up.

It is evident that the cognition which is stimulated by a pain and coexists with it and by it cannot serve as the basis of emotion. The object is felt, but there is no feeling *about it*. The thing is given with the immediate feeling value, but there is no sense of potential experience which is above the basis of such early emotions as anger and fear. In consciousness which is only pain *plus* sense of paining object, there is no attitude of mind toward the paining object. It is scarcely possible for us, indeed, to realize this state of mind, for with us to have a pain and a sense of its objective source is to invariably awaken emotion; yet we must believe that at one period in the history of mind emotion was unevolved, and experience was wholly direct and simple.

Pre-perception, the perception of the thing before its pleasure-pain agency is felt, certainly this had some mode of evolution in slow stages through revivals and association. What is the feeling motive of the pre-perception? what is the nature of this perception of experience value in pleasure-pain terms of the cognized object? and how does this perception generate emotion? These are difficult questions. It is plain that the primary cognition which rises by and with the pain is merely cognition of the object, but not cognition of its pain value, which is certainly a complex and later form somehow based on the former. Injury and pain early involve cognition, but this cognition does not from the first involve emotion which implies representation. Knowledge is in its origin a search for pain-bringer, objects are discovered as vehicles of pleasure-pain, but the first cognition could not have been so complex as an interpretation of the pleasure-pain value of object paining, much less a pre-perception of object as about to pain. Cognition at first is merely with the pain, not of the pain; it is accompaniment of the pain, but it does not view the object in relation to the pain. The association of the cognizing and the pain is a mechanical, not a perceived connection which implies consciousness of consciousness. If cognition is, from the first, sense of experience value as well as sense of

object, then emotion is indissolubly bound up with the whole course of cognition. That the pain incites to consciousness of object, and that there is experience of pain going on simultaneously is certain, but the pain is not at first attached by the mind to the object. The object is felt, but its significance is not known. Possibly in human conscious life we may have something analogous. If I say, 'I feel a tooth coming,' I may mean a peculiar combination of pain and cognition, a mere feeling the object without emotion. A tooth-ache of this form is certainly extremely transient, for we are soon aware of our experience as such, and interpretations from the past and fears for the future quickly enter, and there is the inextricable tangle of feeling, knowing, willing, consciousness of consciousness, consciousness of self, which is the normal state of ordinary human consciousness. However, there is a simple union of cognition and emotion, which is expressed by 'feeling hungry,' for instance, wherein feeling is so predominant that we naturally use the word 'feel.' In this sense all early cognitions are feelings, and we can say the object is felt when cognition is but a dim and slight event in a mass of pain.

The object is not then from the first invested with its pleasure-pain quality. The object is perceived merely, and is avoided or sought as prompted by the pain or pleasure. But there is no cognizance of the impelling feelings, and though the object its known by its pleasure-pain effects, it is not yet known *for* them. When we see a thing we always see in it, its pleasure-pain quality, or even if we do not know its particular form, we know it as having some feeling potency. This is an instinct in our knowing, and the outgrowth of an immense deal of experience. It is the sole value and function of knowledge that it should not simply apprehend the thing but its pleasure-pain-giving nature. But still the first moment in cognition must be termed bare apprehension of object, the feeling being behind the knowing and supporting it, and not a knowing of feeling quality, and a feeling about this. The first moment in all cognition is bare apprehension, which is soon followed by ascribing to the object its feeling significance.

How then from mere concomitancy of feeling and cogni-

tion of object is cognition of the feeling quality of the object achieved? How is object perceived as related to experience, as potent for pleasure or pain? How is the pain-giving object perceived as such?

It is commonly said that association and memory explain this. Upon seeing a hurtful thing we know it to be such from past experience when we cognize the same object while it was hurting, and so related pain to the object. But this sense of experience and relation is just what we have to explain; and we have also to show how the suggestive cognition is brought about, how we see the thing at all before it exercises any real feeling effect on us. There is no doubt that when any object often causes intense pain, cognition of this object is stimulated, and finally pre-perception occurs, but just how is quite obscure. A low organism will repeatedly be injured by some thing, as a sharp object, will plainly suffer pain and have some concomitant knowing to stimulate and direct will-effort, while yet no premonitory knowing or pre-perception is apparent. There seems to be no sense of the experience value of the object even while it is having pain and knowing object. It is pained but not frightened.

Cognition certainly occurs at instance of less and less pain, as also do volition reactions, but yet it must, whether as pre-perception or otherwise, have some feeling initiation, which must always be traced. Can we suppose now that a study of revivals will help us in this, or in determining how sense of experience-value originates? Repeated experiences with the sharp rock enable the organism at expense of less pain, but with clearer and fuller cognition, to escape severe injury. As a fixed sequence of experiences tend to recur together there will follow upon the cognition revival waves of pain before any actual increase of pain is really inflicted in the given case. These waves stand for, and are the echoes of, the former real pain sequences of cognition. Thus the perception of a great mass of ice will often cause a shivery feeling, a painful sensation, which was correlated with former cognition experiences. Even the image or representation, the purely and consciously ideal cognition, may bring in painful feeling, as when I say, 'It makes me shiver to think of it.' Here the sensation-bringing

idea is cognized as such, but the representation here is the occasion of a direct painful sensation, and evidently does not imply fear or other emotion.

While not arising from actual injuries. revivals strengthen both cognition and volition. They have recurred before further hurtful experiences with the rock which originally incited them. These revival pains of previous sequences to the cognition, and which are carried along with the present cognition, are real enough in themselves, yet they are objectively anticipatory of actual injury. The whole order of previous experience is by the nature of mind and nervous system re-enacted before the actual injuries are inflicted. It is always a race between mind and nature, but it is a prime function of mind to anticipate practically the movements of nature. Mind by its revival forms accomplishes this, but if it lags in its work the real injuries are mercilessly inflicted by slow but sure nature. When the sequence of revival is quicker than the objective sequence, the reactions anticipate objective order, and thus is achieved a manifest economy. But pain revivals of this kind are not fear, nor is there a real pre-perception. Since the revival forms are, to the observer's point of view, incentive to anticipatory reaction, psychologists must often, especially with low organisms, mistake them for fear; the animal is often, doubtless, merely suffering revival pains when it appears to be fearing pain. Thus we may suspect that organisms which seem to fear shadows or real objects are often merely suffering revival pains brought up in conjunction with the cognition, and not really fearing as result of perceiving feeling quality inherent in the object. Manifestation of pain must often be mistaken for manifestations of emotion, and there is as yet no accurate objective determination for fear or other emotions. That we always see in things the possibility of feeling and sensation, and this inevitably and naturally, blinds us both to the problem and to its difficulty.

How we perceive a thing before it is in the least experienced in pleasure-pain terms is then wholly unexplained by revivals. Revival pains are not representations of pains as in some way coming from object. Emotion requires representation, and cannot occur in any presentation or re-presentation

chain. True pre-perception is not merely perceiving the thing before its effects in feeling are experienced, but it is a *representing* the feeling quality of the object before, in any given case, this quality is directly experienced. This obviously rests on past experience, but the connecting of object with pleasure-pain experience is at all times, as before intimated, equally a problem. Emotion and representation are built not of revivals but upon them perceived as such. At some critical moment in some rather early period in mental development a consciousness which was pain *plus* sense of object, realized, under the pressure of struggle for existence the feeling quality of the object, and there arose painful emotion with the knowledge of object as pain-giver. And as soon as object is not merely cognized, but cognized as pain-giver, it may be feared. The moment that object was known as a pain agent then fear of the object came, and thus true anticipatory action arose. We are said, indeed, to fear objects, to fear men, animals, etc., but, in truth, the fear is never of the object as such, but only in view of its pain agency. The cognizing the experienced and experienceable as such seems then a peculiar and distinct process in fear and in all emotion, a *genus* apart which cannot be constituted by interaction of simple elements. The growth of mind is largely in multiplying and enlarging the signs of experience.

Fear as involving pre-perception of the painful nature of object is obviously based on some direct experience where the pain was immediately perceived as related to object. The genesis of fear is really in this immediate form; the moment that pain experience is connected with object, the moment the child playing with fire perceives that the object, fire, hurts, then fear is born. Fear originates as soon as pain agency of objects is realized in any direct experience. The germ of fear is reached whenever the knowledge expressed by words, 'it hurts,' is attained. The first stage of fear rests upon the pain relation which is being experienced from object, not a pain having been experienced. The present hurtful objects perceived as such incite to fear.

The connecting of object with pain once achieved, it becomes increasingly easy to cognize the feeling value of objects,

and before full and extreme pain experience therefrom to prereact through emotion. Thus emotion saves both direct pain and injury. As it becomes a permanent tendency and an impulse of consciousness to proceed from all pure feelings to cognition of object, so also to cognition of object in its feeling quality, and thus by inherent tendency it ultimately comes about that there is attaching of pain to various objects cognized, even when there is no immediate experience of pain to be connected therewith. Finally the precedent inciting pains to cognition become such minor factors, and knowledge arises with such apparent spontaneity, that emotion as involving pain significance becomes dominant rather than the immediate pain. An order of consciousness becomes established in which the notable event is cognition of experience values as bringing in emotion rather than an order of pleasure-pain inciting cognition. But at the first it is evident that fear was but a slight event in a consciousness which was mainly absorbed in immediate pain experience and some sense of object. It is so habitual and instinctive for us to perceive all things as having feeling value that it is most difficult to appreciate the standpoint of a consciousness which is just attaining emotion life.

The preliminary elements to simple primitive fear as expressed by any such phrase as, 'it hurts,' are at least four; pain, cognition of object, cognition of the pain, cognition of the pain agency of object. These operations as being at first successive do not necessarily imply, however, sense of time. The consciousness of a pain is certainly, at first, consciousness of pain really past, yet not consciousness of it as past. The pain stands as immediately antecedent act to the consciousness which is cognition of it, but sense of experience is not thereby sense of experience in time. The sense of time-relations of experiences is wholly subsequent to the simple sense of experience. All experience is, of course, in time, but far from being of time.

The earliest fear is not then in view of the experienceable, in view of experience as future fact; fear, at first, is manifested only when and so long as pain is being cognized as from object. As soon as this sense of immediate relation ceases, fear ceases, for its foundation is gone. So long as hurt

XUM

is felt from object, object is feared. The higher and the ordinary form of fear in human psychic life is based on this lower fear. An organism which has repeatedly suffered knowingly from an object and so feared, attains at length the power of fearing antecedent to any real injury. This seems to be brought about somewhat in the following manner. If I in any way, as by a pin pricking, rouse a sleeping animal to a cognition of an object which has often injured it, and which it has often feared, immediately there would re-occur the original concomitants of the cognition in the previous cases, there would be pain, cognition of pain, ascription to object, and fear, all merely revivals, and happening most probably before any actual injury, etc., received in the present case. Now these revivals, as before insisted, do not and cannot in themselves alone form a new fear. This is only constituted when the revival pains are known as such, when they are not merely presented in consciousness, but represented as belonging to past experience of thing, and so to be experienced. The thing is thereby truly *interpreted* for its feeling value. Not merely pain as being experienced is connected with thing, but as having been experienced, and to be experienced. Thus only arises that sense of the experienceable, that real *apprehension* for the future, which is so valuable an acquisition in the struggle for existence. Feeling quality comes thus to be assigned as real and permanent property of things, and every cognition comes to imply representation of feeling value, and so to be a basis for emotion. But all sense of experienceability is founded on sense of experience; the sense of things as possibilities of sensation and feeling is based on actual relatings of feelings to objects in simple direct experiences.

Fear is in itself pre-eminently a painful state, and we have to inquire as to the origin and nature of this pain. The statement of the problem in general form is, how does that which does not yet please or pain, but is only cognized as about to do so, give immediate pleasure or pain?

We have already expressed the opinion that fear is based on more than mere pain revivals; there must be true representation, the revival must be appreciated as representation of past experience and indicative of future. The painful agita-

tion consequent on prospect of pain seems, indeed, to include as pain element more than revival pain, but it is only seeming. Where does the pain come from which a person feels at the mere prospect of pain unless from the past? The pain is, of course, not the identical pain feared. Again, one cannot see how a cognition in itself entirely empty of feeling can cause a pain except as acting as a link in a chain of association whereby conjoined past pains are revived. So far as fear is pain, it is revival, for representation of pain is not pain and cannot cause pain. The pain which arises from cognition of pain to be experienced appears in a strict analysis to be wholly re-occurrence stimulated thereby, and not any new and peculiar mode of pain at pain. That this is the case is apparent from the fact that we can only have the pain of fear so far as we have experienced pain. Poignant pains experienced are the basis of poignant pain in fear. The knowledge that you are soon to re-experience an intense pain leads to an intense dread in which the intense pain is revived from former experience. There are, to be sure, in the phenomena of fear in highly developed consciousness complex pains which cannot be ascribed to revivals, reflexes upon consciousness of the great tension and agitation thereof, pain of loss of self-possession and self-power, and other modes which proceed from consciousness of consciousness, but this does not bear upon the question how mere cognition of pain as to be experienced can in itself give pain, how there arises from mere apprehension, a pain which is more than and distinct from the revival pains.

But, however we may be puzzled to see how mere cognition of experienceable pain develops a peculiar pain which is the essence of fear, yet we must acknowledge its production to be a fact. We may say, indeed, that the bare thought of pain even when conveyed by the printed word—the abstract sign of an arbitrary vocal name—is not without a tinge of a peculiar fear-pain which does not wholly consist of revivals. When preparing to go out into the storm on a very cold day I have pain in anticipation of the pain I am to receive from the bitterly cold wind. Now I may have preliminary shiverings, and there may be recurrent painful sensations as I look intently at the raging elements, pains which return from actual

experiences which I have before undergone and at the time knowingly connected with wind and snow. But all these revivals, while the basis of my fear, do not give the distinct pain quality of the fear. The pain which I do experience when I actually step into the biting blast I know at once to be entirely distinct in quality from that which I before felt at the anticipation, the real pain, of fear. Again, when I say, 'I was deeply pained to hear of it,' and when I say, 'The noise pained me greatly,' I indicate that difference between purely mental distress and sensuous pain, between pain at representation and pain referred to presentation, which is to be emphasized in all our study of emotion. The tortures of fear with a man in the hands of hostile Indians are quite distinct in quality from the tortures actually endured. The agony of fear is a *genus* apart from the agony of physical pain.

Again, if the pain in fear were derived from revivals, then the nature of the pain in different states of fear would be as different as the sensations feared. But as a matter of fact the pain in fear of cold, fear of heat, of famine, of punishment, etc., is substantially of the same quality. I may fear one more than another, but the real mental agitation and pain which constitute the fear are in all cases essentially the same. If the pain in fear were sensation revivals, then fear of cold and fear of heat would be quite diverse and contrary in quality of pain value, but we all know that the dread of a cold day and of a hot day are in themselves essentially the same in nature. As far as the states are pure fear and have a pain quality, the conscious activity in both is entirely similar.

Further, if the pain in fear were wholly of revival nature, not only should we expect fear of different sensations to be correspondingly distinct, but we should also expect the pain in fear to never exceed in amount and intensity the pain feared as indicated by measure of past experience. But we know that our fears are often much more painful than pain feared and than our experience of past pain. The pang of fear, of sudden fright, is often more acute and intense than any direct pain we have ever experienced. The terrible convulsions of fear which we see in the insane give evidence of pain which could not have been reflection from direct experience. That

excessive and sudden fear which turns men's hair gray in a few hours and transforms their whole physical system is plainly not any revival from the individual's past experience. As revealed by its effects it is often, perhaps, greater than the whole amount of pain they have ever suffered. Where, in the direct-experience form, pain is greater in the fear than the real pain suffered, we express the fact by the common phrase, 'more scared than hurt.' In all such cases the pain in fear is not the revival of past experiences of the object feared.

Fear is, in the main, the peculiar pain coming from consciousness of experienceable pain, but in general in all complex consciousness it is marked by dissolution and weakening of mental force. There is a shrinking of will, and a clouding of cognition, a general unsettling of all mental elements, a commotion or agitation which destroys the organic *consensus* of consciousness. But any excessive functioning of some element in consciousness, of emotion life, as fear, or of any other form, is unbalancing and detracts from normal activity of the whole. Fear, however, in its normal measure and form arose and was developed as a desirable stimulant; where it becomes paralyzing in its force, it is pathological in quality. Also where fear is pathologically intense it tends to disappear in sensation feared. Cognition becomes so weakened that sense of representativeness is lost, the thing feared is no longer brought before the mind in its potential quality, but is immediately apprehended as present in its influence—though really objectively absent—hallucination is produced, and fear naturally reverts to its earliest and direct form in immediate experience. As cognition is still further weakened the sense of object as giving pain is lost, and fear in any form entirely disappears. The pain is not felt which before was feared to be felt. Fear thus in the general order of its disappearance repeats the order of its appearance and growth.

Fear always includes some sense of object. The apprehension of something evil to happen is the basis of all fear, but the thing, or, subjectively speaking, the objectifying, may be extremely vague. We may fear that some harm is to befall us, but what and how, we know not. We must suppose that in early stages this bare objectifying of approaching pain was

a regular incipient form, that an indefinite fear preceded every case of defined fear. We, as a rule, attain a full objectifying with such ease and rapidity that this form does not often appear.

A complete fear movement, then, with reference to cognition includes four stages: first, a very general sense of object as about to give pain; second, an increasing definition of object up to the maximum of clearness, thus marking the highest efficiency of the fear function; third, a decreasing definition of object till, fourth, a purely indefinite objectifying is again reached. Every fear, if it attains a normal life, will rise, culminate, and decline in this way. Even in man, where the full development of single simple psychoses rarely proceed undisturbed, there is yet observed a general tendency toward these stages. I awaken in the night at a sudden noise with slight and vague fear; suspicious sounds increase my fear and I listen and look more intently till I see clearly and quite fully crouching near the bed a dark body which I make out to be an armed burglar; as he approaches with his pointed weapon fear will most likely become so intense that I see less and less clearly, and a shot might terrify me into vague but very intense fear. If the object is discerned to be not a burglar but a chair, the fear quickly lapses. At a certain point of maximum clearness either a weakening or an intensifying of fear weakens cognition. Too much or too little pain is equally injurious to the knowing activity. Low psychisms examine and clearly define only that from which they have something to fear or hope.

The qualitative relation of the pain of fear to the pain feared varies greatly with the evolution of mind. Fear-pain could not have originated as a substitutionary function for the real pain except by being at the first somewhat less in quality than the pain to be endured, otherwise there would be no economy in the function. The progress of this function is to secure at less and less expense of fear-pain the suitable reaction. The function of fear being to escape a greater direct pain by a less indirect one, the progress of the function is in diminishing the amount of fear-pain for required effectiveness. The small original gain in the ratio is increased by small in-

crements till in the highest minds proportion of fear-pain to pain feared might be represented by $\frac{1}{\infty}$. The pain in the usual fear which commonly induces me to step from the track before an approaching train, or which enables me after reading some advice on the subject to take precautions against the cholera, is evidently in infinitesimal relation to the pain feared. When fear is unsuccessful, as in anticipating a visit to the dentist, we, of course, suffer a double pain, both the fear-pain and the pain feared.

Often we must observe that the pain of fear is equal to or greater than the experience feared, and we have to ask how this disadvantageous excess could have been evolved. Often the pain of anticipation turns out to be far greater than the pain anticipated. However, a little reflection assures us that the excess of fear in many cases is only in appearance. We do not fear too much upon the judgment we have formed as to the coming pain, but we have by error of judgment assigned too much value to the pain. When a person being initiated into a secret society trembles with fear at being told to jump from a precipice, when he really is to jump but a few feet downward, his fear was perfectly just according to his judgment. If his belief is perfectly assured, the mortal fear will make him offer the most strenuous resistance and most likely secure his release from the ordeal. In all such cases the feeling is right enough, but the estimate of future experience is inaccurate. When an animal is terrified at its own shadow the fear is justly proportioned to the estimate of danger, which, however, happens to be erroneous. In the evolution of mind in the struggle for existence, more and more accurate calculations of possible injury are attained, and fear becomes more and more rational. Educated men fear only what is worthy of fear; they fear many things that lower minds do not, and do not fear many things they do. The true excess of fear is where we fear against judgment, as when, knowing the safety of travel by rail, I am yet constantly in fear while aboard a railway train. When I still continue to fear though I know the fear to be groundless, this is a true hypertrophy of fear. We constantly observe those who are fearful and timid against their own reason. When dangers known

are compared with dangers obscure or unknown—and perceived to be unknowable,—the fear of the unknown often prevails against the fear of the known, and we prefer with Hamlet to fear the ills we have than fly to others we know not of.

I must in conclusion express my conviction that while the physiological and objective study of fear and other emotions is of very considerable value, yet it is only introspective analysis which can reveal the true nature and genesis of fear and all emotion. What fear is and what is the process of its development can only be determined by the direct study of consciousness as a life factor in the struggle for existence. This I attempt in the present paper with the main result that fear, as indeed every emotion, does not consist of pain or cognition-revivals in any form, but is a feeling reaction from the representation of the feeling potency of the object.

EXPERIMENTS IN SPACE PERCEPTION. (I.)

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In undertaking to describe some experiments in the perception of magnitude and distance, I ought first to mention certain peculiarities of my own eyes that are quite different from the majority of cases, and that exempt my results from the difficulties which most observers have to encounter and which often render their judgments doubtful or illusory. I do not refer to any structural peculiarities, nor to defects of any kind: for, as far as I have been able to ascertain, my eyes are quite symmetrically constructed and are free from all usual defects whatsoever. There are no traces of myopia, astigmatism, or similar obstructions to perfect vision, and hence for all distances my sight is remarkably good—a fact, however, which has no interest except to remove certain suspicions which *might* be entertained regarding the experiments I expect to describe below. But the peculiarities to be mentioned concern the dissociation of certain functions which are very closely associated in general experience. I refer first to the various degrees of convergence which I can practise without any interference with the normal functions of vision. For instance, I can cross the eyes and walk about the streets, the fields, or the woods with as great ease and freedom from error as in their natural position. No pain or discomfort accompanies the process, but only a feeling of effort and fatigue after some persistence in it. Still more noticeable is the fact that where most persons suffer from greatly blurred images, I am comparatively free from this disturbance. This is true, however, with qualifications which must be noticed. Thus the blurring is only slight until the fusion of similar images, when the vision becomes normally clear. Thus I may compare with mine the

experience of others whom I have often besought to verify my results.

If two circles are drawn a short distance apart and the eyes crossed so as to produce fusion, I generally find that the images are so blurred by the failure to accommodate the eyes suitably, when others perform the experiment, that no reliance whatever can be placed upon their judgment of the results, no matter what they claim to see, while in my own case there is no blurring whatsoever. The images are as clear and distinct as if I had not converged my eyes. I can freely move my eyes from one to the other of the three circles in the field of vision and back, and up or down, without in the least disturbing the fusion, the clearness of the perception, or the apparent localization and perspective of the figures. I can carry on observations as well under these conditions as when the focalization is natural. Indeed so easy and free from discomfort is the process that, if the field of vision is constituted by some large surface covered with uniform figures, in a few minutes the new position becomes so natural that it is with difficulty disturbed and the normal condition restored. I can carry on the parallel movements of the eyes under these circumstances without any tendency to disturb the convergence, or the localization, which in these cases corresponds to the degree of convergence, or approximately so. I should not even know that my eyes were crossed but for the slight influence undoubtedly exerted by a surface which is not exactly uniform, or whose figures do not produce absolutely identical images.

So much for the effects of convergence within the plane of the paper upon which the circles are drawn. It is similar when I focus the eyes beyond the paper, so as to produce fusion, for all distances greater than about eighteen inches from the eyes. With others I find blurring exceedingly great under these circumstances. They suffer also from the still greater difficulty of keeping the fixation upon one point and the attention upon another either horizontally in the indirect field or in different points on the median line. But neither of these conditions presents any difficulty to my eyes, with the exception just indicated. If I hold the paper more than eighteen inches from the eyes, or place it at any distance within

the limits of fusion by focussing beyond it, and these may be as much as fifteen feet from me, there is no blurring whatever, and I am free, not only to move my eyes over the field with ease and without disturbing the fixation, but also to carry on observations as distinct and clear as normally. Within the eighteen-inch limit the result varies. At first the lines of the circles are somewhat blurred, though the circles are quite distinct and observations comparatively undisturbed. But by a little practice or after a few minutes the blurring diminishes and often ceases altogether until the paper comes within twelve inches of the eyes, when it is noticeable again. But even here the effect produces very little influence upon perception and its accuracy, as the blurring is too slight to affect it. But with these qualifications my vision is as clear and as easy under the circumstances described as under normal conditions. The fact will attach some importance to the following experiments and observations.

I wish to put to the test certain theories of space perception and to ascertain how they conform to the facts of experiment. Ever since Berkeley, much has been made of the muscular and motor influences affecting the problem. But these have been almost wholly confined to the perception of distance or solidity, all parties being influenced by the fact that this quality could not be represented in the retinal impression. The problem has been, therefore, to devise either a sensorial or a motor explanation of this additional datum. The phenomena of convergence, binocular fusion, and translocation of images have been the starting-points of discussion and theory, and hence, finding certain coincidences between them and the localization of objects, the natural supposition was to connect the consciousness of distance with the motor functions involved. The whole question of magnitude, however, in connection with the same functions seems to have been wholly neglected, though its phenomena might be used by both parties to the controversy. On the one hand they seem to confirm the motor-sensation theory, and on the other to suggest such an anomalous relation to sensorial functions, and such a modified conception of the whole process of space perception, that they throw considerable doubt upon the very theory which they seem to confirm. I

shall, therefore, take up first the perception of magnitude, which I find in all my experiments to be variable with the degree of convergence necessary to produce combination of images. Its peculiarities must be very carefully noted.

I shall first describe some very simple experiments with natural objects, which it is possible others can confirm without difficulty, though I have never seen any allusion to them in the literature of space perception. Thus if I close one eye quickly while looking at an object, say a lamp-shade, a plate, a sheet of paper, a window, a house, or anything whatever, there is a most decided impression of diminished magnitude. I cannot say how great the decrease of magnitude seems, but it is distinct and uniform enough to dispute the suspicion of ordinary illusion. Ever since I detected the fact the phenomenon has been absolutely without exception, even when I tried to overcome it by thinking the judgment illusory. The moment that the closed eye is opened the magnitude of the object is apparently enlarged. Nor is the effect due to relaxed binocular adjustment and disparity of images caused by closing and opening of the eyes, for the same effect is noticeable by shoving a piece of card-board between one eye and the object and removing it at once. Besides, the effect does not resemble that which is due to disparity of images. Of course this phenomenon does not illustrate the effect of convergence upon magnitude, as mentioned above. On the contrary, it rather illustrates sensorial influences and probably confirms Prof. James's doctrine of voluminousness in sensations. But it also distinctly suggests other than motor influences affecting spatial properties in our perceptions.

The next class of common experiments illustrates the connection between magnitude and the degree of adjustment. Thus if I cross the eyes and combine the images of two similar windows, say on the opposite side of the street, the diminution in the apparent magnitude of the windows is very distinct, a diminution that continues as long as convergence increases, until the window seems a mere miniature of what it is normally. The degree of convergence will, of course, vary either with the distance between the windows, or with the distance of the eyes from the windows. This fact requires no comment,

but it indicates the conditions under which the observations can be most favorably made, because my vision is more clear and distinct during fusion than before or after it; that is, than when the images are not on corresponding points. But I must remark that the general effect is the same whether the images are fused or not. The diminution of magnitude begins with the change of convergence and continues with it without regard to fusion. Besides, the location of the window seems to be nearer than in the normal position, and this locus is more distinct and definite during fusion than at any other time. Neither one of these results can be confirmed by the ordinary student, and this is not to be wondered at when we consider his lack of experience in such matters. But even trained experimenters may fail to be assured of the effect, because the whole field of vision is equally affected by the process, and because of the cohesion between adjustment and accommodation which makes all images indistinct that are not normal. The phenomenon of localization in this case, however, would probably not be regarded as anomalous: for it is in reality the same effect as translocation in the case of binocular parallax in the combination of geometrical figures drawn for stereoscopic purposes, except that this parallax is not present in the instance described. Hence I need not dwell upon this part of the experiment. But the modification of magnitude is not so easily explained. Nor has any one alluded to it within my knowledge. We might expect accommodation to have a fixed relation to convergence and thus to diminish or enlarge the image according to the usual law by making it indistinct. But such is not the case, and the diminution may be due to the alteration of the pupil and not the lens, so that the image is actually made smaller by virtue of the decreased aperture for the light. This might take place from the habitual connection between accommodation and convergence on the one hand, and between accommodation and the modification of the pupil on the other. But I have no means of proving such a supposition, as I cannot observe my own eyes in the operation. I can only conjecture that habit and association may establish a more or less fixed relation between functions which are in their nature distinct, and whose effects become particularly clear

when blurring does not occur from an altered accommodation. Accommodation in these cases is perfect, for there is no obscurity from unfocussed rays of light. Only the images appear smaller, and hence if the connection between the area of the pupillary aperture and the degree of convergence remains more fixed than that of accommodation and convergence, so as to decrease with the increase of convergence, we might suspect what the cause is. But as I do not find any alteration of the magnitude of images from the artificial dilation of the pupils, I may well doubt the influence of their modification, while also raising the question whether they necessarily undergo any change from the alteration of convergence and without any change in the brilliancy of the light from the objects. This suspicion is more than confirmed by the fact that in no instance, where I have changed the illumination upon an object, have I noticed any modification of magnitude follow the contraction or the expansion of the pupil, as the case may be. It is only when convergence takes place that this effect is noticeable and without any alteration of the light from the object. Further proof of this will be given again after further illustrations of the effect.

A very beautiful effect can be produced in the following manner. If I look at a large surface, say the side of a building having some regular and uniform decoration, and cross the eyes so as to combine certain similar portions of it, the windows for instance, the fusion takes place over the whole area, representing distinctly every point or mark in the field of vision, except on the margin of the indirect portion. But the figures are much diminished in magnitude, and this diminution, as before, increases with the degree of convergence, and becomes a comparative miniature of the real size. If the point of fixation is as near as two feet, the whole surface seems distinctly within reach though the wall be fifty or one hundred feet away, and I can put out my hand and touch it or write upon it as it were, the illusion being perfect except for the absence of tactual sensation. I can move my eyes about over the whole field and by retaining the fixation for two or three minutes can eliminate all feelings and associations of the real distance until I seem to be before one of the delicate models

we so often see of various forms of architecture. The moment that I break the convergence the sudden change to the normal distance and size of the wall with its figures creates a kind of shock or surprise, so distinct is the contrast and sense of illusion. The same phenomenon shows itself when I cross the eyes to combine the figures of wall-paper, the size and titles of two similar books, the letters of two similar pages of reading, the squares of a screen, or any similar figures whatever. The magnitude is diminished in proportion to the convergence. Indeed resemblance in the form of the figures is not an essential condition of the effect, only it prevents rivalry and aids in an easy and agreeable retention of a given degree of adjustment.

Now the next question is whether I can produce an apparent enlargement of size by focussing the eyes beyond the plane in which the figures to be combined may lie. Unfortunately there are decided limitations to the performance of this experiment. It is impossible to try it with objects at a considerable distance or more than a certain space apart from each other. Nevertheless I have been able to do so under favorable circumstances and within the limits referred to. Thus I have taken two books of the same kind and titles, and by focussing the eyes beyond them combined the letters and effected a very considerable enlargement of them. I get the same result from a similar combination of any figures capable of it. But both the diminution and enlargement of magnitude can be illustrated, as I have described them, by the following experiments, and perhaps some clue to an explanation obtained at the same time.

I take two circles as represented in Fig. 1, drawing them

FIG. 1.

only a short distance apart from each other. If I cross the eyes until the circles fuse there will be three circles in the field

of vision, all of them perfectly clear and distinct. No suppression of the external circles takes place unless I concentrate attention very strongly upon the central circle, and then they may wholly disappear, to return again when attention has been relaxed. But the central of the three circles, which is the combination of the images cast upon the external halves of the retinas, seems distinctly smaller, and very generally somewhat nearer than the other two, but all of them smaller than the original circles. The following figure (Fig. 2) represents the appearance of the three circles after fusion, and, as nearly as I can make them, in the proportion between their several magnitudes, and also in the proportion between the magnitudes of the apparent and the magnitudes of the two original circles in Fig. 1. It must be remarked, however, that the magnitudes of the three circles vary with the degree of convergence required to combine the two, and hence is proportioned to the distance between the original figures, and it is most remark-

FIG. 2.

able that the distance of the eyes from the paper does not affect the apparent magnitude of the circles any more than it does in normal vision. This accords with the law of convergence, which increases and decreases, *ceteris paribus*, with the distance from the eyes of the objects combined. This incident will be the subject of comment later in the discussion. But some conception of the effect will be found by comparing Fig. 2 with Fig. 1, since the three circles represent, as nearly as I can determine it without mechanical measurement, which is impossible in the case, the modifications of magnitude accompanying combinations of the two circles in Fig. 1. So far from there being any illusion about it varying with the judgment of the facts, in the many thousands of experiments I have tried there has not been *one* variation from this result, the only differ-

ence being in the size of the original circles. The diminution is then proportional.

Now in regard to the explanation of the fact, it is clear that it cannot be attributed to a contraction of the pupil. This supposition might account for the decrease of magnitude compared with the circles in Fig. 1, but it will not account for the smaller diameter of the central circle in Fig. 2 compared with the external circles, because the pupillary contraction is the same for all of them. There is, of course, the conclusive fact already alluded to, that a modification of the pupil in normal vision is not followed by a corresponding alteration of the apparent size of the object. But in spite of this we might be tempted to consider such an influence as possible in artificial convergence and yet the anomaly in Fig. 2 effectually excludes this hypothesis. Nor does it fare any better with the supposition that the modification of the lens produces the effect. This influence might again account for the diminution in comparison with Fig. 1, but the same difficulty as before occurs when the difference between the central and the external circles is considered. The force of this supposition in the first instance, that is, in the comparison between the original circles and those after combination, cannot be lightly ignored. For, other things remaining the same, an alteration in the convexity of the lens will affect the magnitude of the image—a well-known optical law. Now if the mere habit of altering the lens to suit the direction of the rays of light and in perfect consonance with the degree of convergence is likely to affect its convexity—that is to say, if the association of a given degree of convexity with a given degree of convergence is likely to be strong, then the mere convergence of the eyes to produce fusion artificially may be accompanied with the corresponding degree of accommodation, and this increase of convexity in the lens would produce a diminution of the image and a corresponding decrease in the apparent magnitude of the circle. Whether such an associative connection between accommodation and convergence exists or not, I am not able to say. But the supposition, though probably true for most persons, as indicated by the indistinctness of the images, has its difficulties in my case. For

the circles are as clear and distinct after convergence as before it. Now as we suppose accommodation to be instigated solely by the direction of the rays of light, and as these remain exactly the same under both conditions, the focus for the retinal image must be the same, and as the image is clear there is no optical reason for a modification of the lens. It would seem, therefore, that there must either be an obscurity or a blurring of the image, or the absence of all modification of the lens. Hence while associative influences might account for a real diminution of the retinal image, they conflict with retinal distinctness and the optical reflex which is the primary agency in accommodation. But whatever strength the supposition might have in comparing the decrease of magnitude with the magnitude of the original circles, as already remarked, it is fatally contradicted by the difference in magnitude between the central and external circles of Fig. 2, or the difference which I have described is an illusion. It is too distinct, however, for me to suppose the latter alternative, and I must adhere to the former conditions whether they offer any difficulties or not. Nor will the functions constituting convergence help us to explain the whole phenomenon, for we encounter the same difference between the central and the external circles while the adjustment remains the same for both. If, however, we can suppose that the apparently nearer localization of the central circle represents a correspondingly greater degree of muscular tension, or sensory effort at fusion, if sensory it be, than for the localization of the external circles, which is purely monocular, we might readily admit the influence of convergence in the case. For we might refer the diminished magnitude of the external circles compared with the originals in Fig. 1 to the contraction of the lens with the consequent diminution of the retinal image, and the magnitude of the central circle in Fig. 2 to this contraction of the lens *plus* the binocular tension involved in convergence and fusion.

A confirmation of all this is found in the reversed effects of combining the circles by focussing the eyes beyond the plane in which the figures lie. If I do this there are three circles in the field as before. But the central figure, which is the combination of those on the *internal* halves of the retina, appears

larger than the other two, and all of them larger than the originals, while the central circle appears very distinctly both farther from the plane of the two on the paper, and farther off than the two external circles, ostensibly at the point of fixation. This whole result is illustrated in Fig. 3, which has been drawn under the same conditions and with the same proportions, if possible, as in Fig. 2. Here we have an effect which is just the opposite of convergence within the plane, and it illustrates what would take place could we apply the process to objects and surfaces in general as we can the convergence just mentioned. For the sake of brevity and clearness I shall speak of convergence within the plane on which the figures lie as *positive*, and beyond it as *negative*. Now if positive convergence shows a tendency to diminish magnitude both in the case of geometrical figures drawn on a plane and in that of real objects, figures, etc., on walls and large surfaces, we should expect an enlargement of this magnitude in the case of negative convergence, and so we find it, though there are limitations to the application of the process generally, which are determined by the limited extent to which negative convergence is possible. But there is every reason from what occurs in Fig. 3 and from the case of the book titles, already described, to believe that the effect of enlargement under negative convergence would

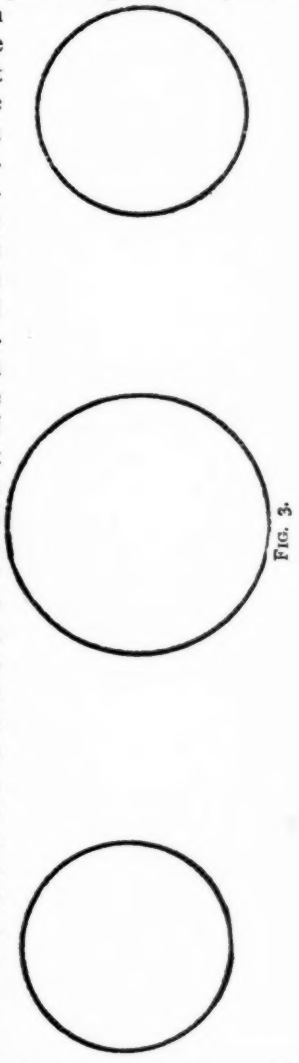

FIG. 3.

be as universal as diminution is under positive convergence, if only these limitations did not interfere. However we have here the whole principle illustrated, and that is a tendency to enlargement of magnitude with negative convergence.

Now as to explanation, it is not necessary to go through the whole length of criticising the supposition of pupillary expansion, which may be considered as rejected once for all. Nor need we emphasize the difficulties attaching to the differences of magnitude between the three circles: for we have only to suppose a combination of binocular adjustment and the expansions of the lens to account for this difference, and this hypothesis has fewer difficulties to contend with than the similar one under positive convergence, because within the distance of eighteen inches from the eyes the images are blurred, a fact that accords exactly with the possibility of a fixed, natural or associative, connection between accommodation and convergence. Beyond the eighteen inches the focus may be so nearly the same for all distances, and the modification of the lens so complex and peculiar, as not to affect the distinctness of images, so that no unquestionable fact would thus stand in the way of the supposed possibility mentioned. Confirming this, in a measure at least, is the fact that within certain narrow limits I can voluntarily contract the lens of the eyes without modifying or changing the degree of convergence, but beyond these limits the effort invariably results in convergent movements. The relation between accommodation and convergence is, therefore, not an absolutely fixed one, so that there may be variations often and large enough to account for the discrepancies supposably due to the ordinary laws of optics. If so, all the phenomena are closely connected with the processes, sensory or motor, of combination and adjustment.

A very interesting negative confirmation of this comes from the observations of some of my students who are fortunate enough to get any results at all. Usually I find that they cannot see the two external circles, but occasionally a student is found who can see them. But quite invariably they can distinguish no difference of magnitude between them and the central circle, nor any difference in the localization of the central circle in the third dimension. Besides, they find all the

circles so blurred that a comparison would be somewhat difficult. I hope still to discover some who are free from this difficulty. But as long as this obstacle remains and they cannot detect a difference of apparent tri-dimensional distance between the central and the external circles, there should be no surprise at the failure to perceive a difference of magnitude. For, as indicated, this might depend upon a difference between binocular tension in convergence and monocular tension in the contraction of the lens, and we have no *a priori* reason to suppose that this either must or may take place. But, not to say anything of the influence of association and the development of the phenomenon by practice, the connection between accommodation and convergence may be so fixed in most cases, which the fact of blurred images in the cases at hand favors, that a difference of tension between the two functions might not arise. It is plausible, therefore, to regard the failure as a negative confirmation of the hypothesis advanced.

Nevertheless, plausible as such an hypothesis might be, it is not easy to sustain. In the first place there are two problems here; the general modification of magnitude, and the difference of magnitude between the three circles. If the general diminution is caused by convergence, all three circles should be of the same size and located in the same plane. This fact would also be true if the effect were produced only by accommodation, either the adjustment or the acccommodation being the same for all the images. But to suppose a difference between the tension of binocular convergence and monocular accommodation is only to suppose that what accommodation does for the external circles it must do for the central instance, and that would be to locate them in the same plane. Moreover, how little accommodation has to do with the effect would naturally be inferred from the enormous disparity between the reduction of magnitude and the degree of modified accommodation supposable. Thus if I look at an extended surface, fifty or one hundred feet distant, decorated with windows, frescoes, and other similarly symmetrical figures, and combine identical forms, the diminution of magnitude, if the convergence is considerable, is so great that we can hardly conceive that it is explained by supposing a corresponding decrease of

the retinal image. Distance has more to do with this than accommodation. Windows that are twenty feet long and five or six feet wide and fifteen feet apart, at sixty feet distance will appear under fusion to be possibly not more than one fourth their real size, a mere miniature of the original. Such a reduction by an alteration of the lens, while the image remains quite clear, seems impossible. But a judgment of this kind is not proof and the matter will require much more careful analysis to settle it.

But I must first prove the fact and the amount of modified magnitudes. The layman's objection, and that of the scholar also who cannot perform the experiment, would be the query as to the evidence for what is here asserted. No direct comparison, other than one's own feelings, can be made between the size of natural objects or geometrical figures and that of the images seen under altered adjustment. The comparison has to be made through memory, and this is liable to illusions. But the first plain reply to an objection of this kind is the fact that when the objects or figures combined are a considerable distance apart, the modification by adjustment is so great that the charge of illusion would make memory unreliable for distinguishing the magnitudes of a silver dollar and a silver ten-cent piece seen separately at an interval of four or five seconds.

Fortunately I am not left wholly to subjective impressions and judgments for the evidence of modified magnitudes in the several illustrations chosen. I have been able to measure certain cases of them, and can state in inches or parts of inches the variation of size from that of the original objects or figures. This I effected in the case of the circles by passing a wire through the central circle of the three so as to form its diameter, one end terminating in the circumference, and then marking where the circumference intersected the wire at the opposite end of the diameter. This is done at the point of fixation where the central circle seems to be. This diameter can then be measured and compared with that of the original.

In Fig. 1 the circles are just one inch in diameter. Combining them by positive convergence at a distance of six inches from the eyes the central of the three circles has a diameter of $\frac{8}{16}$ or $\frac{1}{2}$ of an inch. At one foot's distance it is

also $\frac{8}{16}$, and at two feet distance it is still the same, so that the distance from the eye does not affect the result. But if the two circles in Fig. 1 are placed farther apart—that is, farther from the median line, the decrease in magnitude in connection with convergence is much more marked. Thus when the circles are two inches apart, the diameter of the fused central circle, as represented in the manner of Fig. 2, is, as near as I can determine it, only $\frac{13}{32}$ of an inch, at the same distance from the eyes as before mentioned. This is only a little over one third of the diameter of the original circles. The difference or reduction is still greater when the distances between the circles is greater.

In order to ascertain whether the same law held true for negative convergence I drew the circles upon a plate of glass, making them $1\frac{1}{4}$ inches in diameter, as they were drawn with a fifty-cent silver piece, and to make the experiment practicable the circles were separated by only $\frac{3}{8}$ of an inch interval, so that the point of fixation would not be beyond the reach of my arm. Combining them by negative convergence, focussing beyond the glass, with the circles only six inches from the eyes, I first *guessed* the apparent diameter of the central circle and made it four inches, and found by measurement, as before, that it was exactly this. At nine inches distance the diameter was still the same four inches; at twelve inches the focus was beyond the reach of my arm, but by the aid of a second person the measurement was effected and the diameter was still four inches. This shows the same law as for positive convergence. In this case the magnitude of the external circles was not measured. But it was decidedly smaller than the central circle and apparently much nearer the eyes. But the magnitude of the external circles for positive convergence can be measured and compared with that of the central circle. This is effected by keeping the measuring wire in the same plane as the central circle, that is, in the horopter, and measuring off the apparent diameter of the external circle, which I can do by turning the eyes to the right or the left, as the case may be, without altering the convergence. In Fig. 1, I find in this way that the external circle measures $\frac{9}{16}$ of an inch in diameter. If the circles are larger the difference is more notice-

able and more easily determined. There is great danger of error in the measurement of the external circles because the wire would necessarily show a greater diameter as we approach the plane of the paper. The same would be true of the central circle were it not for the facts that it is so distinctly located at the point of fixation, and that the wire appears double and beyond the circle if placed beyond this point. At that given point, of course, the wire would give only $\frac{9}{16}$ of an inch for the original circles on the paper, as actual measurement shows, so that the measurement of the external circles must be made in the same plane. Hence it appears that the diminution of the central circle compared with the external two is connected with fusion, while the diminution of the other two, less than the central circle, is connected with the general convergent condition.

This measurement of magnitudes, showing a difference between the central and external circles, and the remarkable ratio of decrease in size with the degree of convergence, taken along with the perfect clearness of the images, create considerable difficulty for the hypothesis that the effect is or may be due to associative contraction of the lens. For this contraction must be the same for both the binocular and the monocular circles, and hence ought to affect both alike. But it does not. In the second place we can hardly imagine that the contraction would be so great as to reduce the diameter of the retinal image by one half. And with circles farther apart this reduction may be to one third or even one fourth of the original. It does not seem that the contraction of the lens could be so great. Moreover, as more distinct proof of this, *the diminution of magnitude does not take place when one eye is covered or closed and attention fixed within or beyond the plane of the paper,* until a marked degree of convergent tension is reached, such as puts a strain on the eyes, except, of course, such diminution as I always remark on closing one eye, and which I have described above. *But blurring of the images in this case is always observed,* while within extreme limits no diminution of magnitude like that of binocular combination occurs. There is a slight illusion of it, as would be natural and to be expected from association. But the effect is so distinct from

that of binocular fusion that the two cannot be compared, as any observer who can repeat the experiment will readily observe. The uniform indistinctness of the binocular images in this instance is the proof of one difference, and the marked difference between the monocular and the binocular effect is another fact of importance rather inconsistent with the supposition of associative ciliary influence and diminished retinal magnitudes.

(*To be concluded.*)

PERSONALITY-SUGGESTION.

BY PROFESSOR J. MARK BALDWIN,

Princeton University.

In a recent article in *Mind** entitled *Imitation*, I endeavored to show the order of rise of the child's various consciousnesses of himself, distinguishing in order three stages of development which I called 'projective,' 'subjective,' and 'ejective,' respectively. The first of these was grounded on so-called phenomena of 'personality-suggestion,' which I wish in this paper to submit to further analysis.

In the way of general definition, the following may be quoted from my earlier article (*loc. cit.* p. 40):

"One of the most remarkable tendencies of the very young child in its responses to its environment is its tendency to recognize differences of personality. It responds to what I have elsewhere called 'suggestions of personality.' (*Science*, N. Y., 1891, p. 113.) As early as the second month it distinguishes its mother's or nurse's touch in the dark. It learns characteristic methods of holding, taking up, patting, kissing, etc., and adapts itself by a marvellous accuracy of protestation or acquiescence to these personal variations. Its associations of personality come to be of such importance that for a long time its happiness or misery depends upon the presence of certain kinds of 'personality-suggestion.' It is quite a different thing from the child's behavior towards things which are not persons. Things get to be, with some few exceptions which are involved in the direct gratification of appetite, more and more unimportant: things get subordinated to regular treatment or reaction. But persons get constantly more important, as uncertain and dominating agencies of pleasure and pain. . . . A person stands for a group of experiences quite unstable in its prophetic as it is in

* New Series, III., Jan. 1894, pp. 26–55.

its historical meaning. This we may for brevity of expression, assuming it to be first in order of development, call the '*projective* stage' in the growth of personal consciousness."

The phenomenon of 'personality-suggestion' is so important in the growth of the child's consciousness of himself, of his belief in realities about him, and of his social life, that it should be closely scrutinized. This is the more important because such an analysis has never been made upon the basis of actual observation of children. The treatment which follows is based upon most detailed and watchful inspection of my two children H. and E., with especial reference to the development of the sense of their own relation to the persons who moved about them.

As outcome of this kind of observation, and with no intermixture of interpretation, which may be now left over, I find no less than four phases of experience involved in what afterwards becomes the so-called 'social sense.' I say 'afterwards becomes' because all of them belong in the 'projective' stage of the child's sense of self, i.e., they all go to furnish data which he afterwards appropriates to himself as 'subject.' These four phases are indescribably subtle and indescribably intermixed in the subjective *ensemble* of the growing child. So much so that I shall not attempt in all cases to cite actual situations to justify each point: rather the view I take rests upon innumerable situations, and their differences from one another. Just as one is utterly unable to give examples of his own phases of attitude expressive of the *nuances* of meaning which the actions of others bring out of him, so entirely a matter of insight and intuition must his sense be of what is in the child's mind in the various social situations which confront him from day to day. Nevertheless the drift of the infant's development is very clear to the sympathetic observer; and I think the instances which I cite will be sufficient to excite in all those familiar with little children a sense of the truth of the general portrayal.

1. The first thing in the environment of the infant which it notes—apart from the ordinary fixed and static stimulations, such as sounds, lights, etc.—are *movements*. The first attempts of the infant at anything like steady attention are directed to

moving things—a swaying curtain, a moving light, a stroking touch, etc. And further than this, the moving things soon become more than objects of curiosity; these things are just the things that affect him for pleasure or pain. It is movement that brings him his bottle, movement that regulates the stages of his bath, movement that dresses him comfortably, movement that sings to him and rocks him to sleep. In that complex of sensations, the nurse, the feature of moment to him, of immediate satisfaction or redemption from pain, is this —movements come to succor him. Change in his bodily feeling is the vital requirement of his life, for by it the rhythm of his vegetative existence is secured; and these changes are accompanied and secured always in the moving presence of the one he sees and feels about him. This, I take it, is the first and great association of the infant with other persons, the earliest reflection in his consciousness of the world of personalities about him. At this stage his 'personality-suggestion' is this *pain-movement-pleasure* psychosis: to this he reacts with a smile, and a crow, and a kick.*

Many facts tend to bear me out in this position. My child cried in the dark when I handled her, although I imitated the nurse's movements as closely as possible. She tolerated a strange presence as long as it remained quietly in its place: but let it move, and especially let it usurp any of the pieces of movement-business of the nurse or mother, and its protests were emphatic. The movements tended to bring the strange elements of a new face into the vital association, pain-movement-pleasure, and so to disturb its familiar course: this constituted it a strange 'personality.'

It is astonishing, also, what new accidental elements may become parts of this association. Part of a movement, a gesture, a peculiar habit of the nurse, may become sufficient to give assurance of the welcome presence and the pleasures which the presence brings. Two notes of my song in the night stood for my presence to H., and no song from any one else could replace it. A lighted match stopped the crying of

* Undoubtedly this association gets its value from the other similar one in which the movements are the infant's own. It is by movement that he gets rid of pain and secures pleasure.

E. for food,* although it was but a signal for a process of food-preparation lasting several minutes: and a simple light never stopped her crying under any other circumstances. So with this first start in the sense of personality we find also reasons for the differences of different personalities: but this constitutes the next phase.

2. It is evident that the sense of another's presence thus felt in the infant's consciousness rests, as all associations rest, upon *regularity* or repetition: his sense of expectancy is aroused whenever the chain of events is started. And this is embodied at this stage largely in two indications: the face and the voice.† But it is easy to see that this is a very meagre sense of personality: a moving machine which brought pain and alleviated suffering could serve as well. So the child begins to learn in addition the fact that persons are in a measure individual in their treatment of him, and hence that individuality has elements of uncertainty or *irregularity* about it. This growing sense is very clear to one who watches an infant in its second half-year. Sometimes its mother gives a biscuit, but sometimes she does not. Sometimes the father smiles and tosses the child; sometimes he does not. And the child looks for signs of these varying moods and methods of treatment. Its new pains of disappointment arise directly on the basis of that former sense of regular personal presence upon which its expectancy went forth.

This new element of the child's 'social sense' becomes, at one period of its development, quite the controlling element. Its action in the presence of the persons of the household becomes hesitating and watchful. Especially does it watch the face for any expressive indications of what treatment is to be expected: for facial expression is now the most regular as well as the most delicate indication. It is unable to anticipate the treatment in detail, and it has not of course learned any principles of interpretation of the conduct of mother or father lying

* Observation made in her fourteenth week.

† I have special observations on H.'s responses to changes in facial expression up to the age of twenty months. Her changes of attitude indicated most subtle sensibility to these differences—and normal children all do, I think. Animals show the same remarkable 'projective intuition,' if the expression be allowed.

deeper than the details. It is just here, I think, that imitation arises, as I have said elsewhere,* and becomes so important in the child's life. This is imitation's opportunity. The infant waits to see how others act, because its own weal and woe depends upon this 'how'; and inasmuch as it knows not what to anticipate, its mind is open to every suggestion of movement. Its attention dwells upon details, and by the regular principle of motor reaction which imitation expresses, it acts these suggestions out.

All through the child's second year, and longer, his sense of the persons around him is in this stage. The incessant 'why?' with which he greets any action affecting him, or any information given him, is witness to the simple puzzle of the apparent capriciousness of persons. Of course he cannot understand 'why': so the simple fact to him is that mamma will or won't, he knows not beforehand which.

But in all this period there is germinating in his consciousness—and this very uncertainty is an important element of it—the seed of a far-reaching thought. His sense of persons—moving, pleasure-or-pain-giving, uncertain but self-directing persons—is now to become a sense of *agency*, of power, which is yet not the power of the regular-moving door on its hinges or the rhythmic swinging of the pendulum of the clock. The sense of personal actuation—'projective agency'—is now forming, and it again is potent for still further development of the social consciousness.

3. With all this, the child's distinction between the persons who constantly come into contact with him grows on apace in spite of the element of irregularity of the general fact of personality. As before he learned the difference between one presence and another—a difference which was overcome in the discovery that every presence is of irregular value: so now he learns the difference between one *character* and another—the regularity of personal agency as opposed to the regularity of mere associations of movement. Every character is more or less regular in its irregularity. It has its tastes and modes of action, its temperament and type of command. This

* *Mind, loc. cit.* p. 41 f.

the child learns late in the second year and thereafter. He behaves differently when the father is in the room. He is quick to obey one person, slow to obey another. He cries aloud, pulls his companions, and behaves reprehensibly generally when no adult but his nurse is present, who has no authority to punish him. This stage in his 'knowledge of man' leads to those active differences of conduct on his part which give to imitation, and the discipline of obedience, a sword with two edges, one for good and one for evil. This general appreciation of character, together with the full-blown social feeling, which constitutes the fourth phase in my division, may be left for later discussion.*

To sum up: 'personality-suggestion' is the general term for the stimulations to activity which the child gets from persons. It develops through three or four roughly distinguished 'stages,' all of which illustrate what I have called his 'projective' sense of personality—i.e.: 1. A bare distinction, on the ground of peculiar pain-movement-pleasure complexes, *of persons from things;* 2. A sense of the irregularity of the behavior of these persons, which is the germ of his *sense of agency*, as opposed to the regular causal series of conditions which things go through; 3. His distinction, vaguely felt but reacted to with great exactness, between the characteristic modes of behavior or *personal character* of different persons; 4. After his sense of his own subject-agency arises by a process of imitation, he gets what is really *social-feeling:* the sense of others as 'ejective,' i.e., as like and equal to himself.

* I have noted in the article already referred to in *Mind*, pp. 44 ff., the function of this stage of personal consciousness in the genesis of the moral sense.

SHORTER CONTRIBUTIONS.

SENSATION-AREAS AND MOVEMENT.

BY PROFESSOR W. O. KROHN,

University of Illinois.

Mr. H., who in the fall of 1892 was the 'coach' of a university foot-ball team, had his left forearm broken in a hotly-contested game, while playing his eleven against that of another institution. The surgeon who was called did his work in such a bungling manner that, after the bones had begun to knit, the arm had to be broken over again in order to set it properly. To keep it in the correct position a plaster cast was made which held it firmly. This plaster-of-paris case extended from the knuckles to a point above the elbow. After three months the case and bandage were removed. Of course, during the entire period when encased in the plaster, the forearm had not been moved either at the wrist or at the elbow. I then endeavored to test the sensibility of the skin on this arm which had not been moved for so long a time. To do this I applied the points of a pair of dividers or compasses which were separated more or less widely, after the manner of the usual aesthesiometric tests. The forearm was divided into four different areas for purposes of more accurate comparison with the sensitiveness of the skin on the uninjured right forearm of the same person. Without going into detail, it should be stated that on the left forearm—the one so long immovable—when the two points touching the skin at a given locality were separated by as much as 55 millimeters, they were felt as one instead of two; while on the right forearm they would only have to be about 20 millimeters apart in order to be perceived as two. On the back of the 'lame' arm at a different locality from that just mentioned, it was found that even when the two points of the dividers were 75

and 80 millimeters apart, they were felt as one; while at a corresponding locality on the right arm the skin was so sensitive that points but 17 millimeters apart could be felt as two. It must also be observed that this particular person, with reference to a large number of activities, had always previously been practically ambidextrous—indeed, he never had to favor the left arm at all. In his position as gymnasium instructor, he could (before the accident) manipulate the dumbbells, Indian clubs, play base-ball, hand-ball, and the like, with the left hand as well as with the right. It would seem, then, that the sensibility of the skin over the injured forearm was lost simply because that member was for so long a time immovable. This has an important bearing on the oft-mentioned principle to the effect that "the localizing power is delicate in proportion as the skin covers a movable part of the body."

ADJUSTMENT OF SIMPLE PSYCHOLOGICAL MEASUREMENTS.

BY E. W. SCRIPTURE, PH.D.,

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Given the measurements $a_1, a_2, \ldots, a_n$, to find the best representative value.

The use of the arithmetic mean

$$a = \frac{a_1 + a_2 + \ldots + a_n}{n}$$

involves the assumption that the deviations from the average, $V_1 = a_1 - a$, $V_2 = a_2 - a$, $\ldots$, $V_n = a_n - a$, occur with probabilities according to Gauss's law,

$$y = w_0 \exp(-\pi w_0^2 V_2),$$

where y is the probability of any deviation V_2 and w_0 is the probability for $V = 0$.

Bernoulli's theorem justifies the substitution of the actual frequencies for the probabilities when n is very large, thus enabling us to test the law by actual experience. The law has been verified for careful measurements in physical and

astronomical work. It does not hold good for statistical and psychological measurements.

The use of the geometric mean

$$a = \sqrt[n]{a_1 \times a_2 \times \ldots \times a_n}$$

involves the assumption that

$$y = w_0 \exp\,(-\pi w_0[\log a_i - \log a]).$$

This distribution of deviations has been approximately verified for statistical and psychological results.

As n can be made large only on exceptional occasions, the choice of the representative value is thus left largely to the discretion of the investigator. To avoid this uncertainty Fechner has proposed the use of the median or central value, whose position in the series of separate results arranged according to size is given by

$$\frac{a_1^0 + a_2^0 + \ldots + a_n^0 + 1}{2} = \frac{n+1}{2}.$$

That is, if all the results are to be arranged in the order of their size, the median value will be just in the middle. Since with finite units of measurement there will be a number of results having the same value around the middle, the value a will be determined by interpolation. The importance of the use of the median lies in the fact that it involves no assumption in regard to the distribution of the separate deviations. When the results follow Gauss's law the median is the same as the arithmetic mean; when their logarithms follow this law it is the same as the geometric mean. The arbitrary assumption of either law is thus excluded.

This method of adjustment, which seems logically the only correct one, has been employed for some time in my laboratory. The calculation of the median can often be performed mentally where that of the arithmetic mean requires pencil and paper and that of the geometric mean requires logarithms also. Cases have frequently arisen where the arithmetic mean unquestionably misrepresents the results, whereas I have never found any objection to the median that is not common to all representative values.

DISCUSSION.

JUDGMENT AS "THE COLLECTIVE BECOMING ABSTRACT."

The articles by M. Egger in the *Revue Philosophique* for July and August upon 'Judgment and Similarity' are a striking illustration of that most salutary psychological law that every one who thinks is sure to refute himself. He says that the judgment is not contained even potentially in the concept, although it is evident that the chief object of his articles is to get the concept out of the judgment. Strange that he fails to see how real his success is. Also he opposes those who have asserted the reducibility of association by contiguity to that by similarity, but says himself that all judgments are associations by similarity, and this, unless I be very much mistaken, is exactly what his imaginary foes have always meant. Throughout M. Egger builds more wisely than he knows.

'The collective idea becoming abstract,' which is M. Egger's definition of the judgment, is just what modern psychology means by conception. M. Egger unfortunately thinks of a concept rather than of conception, and from the concept, as the abstract idea or logical class, which, like its blood-relations, the idea-centre and the spiritual soul, has been exiled from psychology, it is not strange that he is unable to derive the judgment.

The abstract idea, that passed for the concept so long, was the unifying principle of a manifold of experiences. As Kant could write of space as *a priori* form, before the psychology of space as founded on movement or action, on the association of muscular sensations and 'local signs,' had been reported, so in general the abstract idea, as a formal principle, could be recognized and seriously used in psychological theory, before the processes of organic functioning, as the subject-matter of physiology, were exposed. But, just as now *a priori* space means nothing but the power of perfectly free movement, so the abstract idea, as a principle of unity, stands for free action; the abstract idea is not an idea at all, but an act: conception, from being

classification, has become organization ; it is co-ordination of, or adjustment to, not logical or abstract unification of, a manifold.

With this view of conception it is easy to see that M. Egger has hit upon a very important principle when he banishes all relations of extensity or contiguity to the *terms* of the judgment, refusing to recognize any but judgments by similarity, the copula naming only similarity. As he says, with less emphasis than we could wish, the process of judgment has too long been explained through its merely external expressions in language, in some particular language of course, in French, or English perhaps, or German, so that the differences between thinkers have had rather a grammatical than a psychological basis. The judgment makes but is not the sentence. Also,—and here is an idea only very darkly and deeply implied in M. Egger's final definition of judgment,—so long as words, sentences, and the like are conditions or incidents of judgment, the act of judgment, as, for example, the assertion that A is B, is as much a judgment of space as my now seeing yonder chair in the corner of my study is a judgment of space. Surely all symbols are spatial. The concept element, then, in any judgment is the functional movement or adjustment that the symbol represents. The terms of any judgment are the inhibited movements, or rather the organization or adjustment, which demands the inhibitions, as attribute or predicated quality—the 'abstract idea' of former days, and the spatial images, symbols, or characters which the inhibitions bring to consciousness as subject or substantive. Moreover, within the subject properly belong all the facts of spatial relationship or quantity or contiguity.

The judgment defined as *the collective becoming abstract* is but another way of saying that the limit of conception is second nature or habit, and that, so long as habit is not yet acquired, the judgment, that is, consciousness in general, exists. So long as habit is not acquired there is a tension between substantive and attribute, between spatial symbol and the 'abstract' organizing act ; with the acquisition the judgment passes into a definition.

As geometry is the complete definition of space, and as it is a possible science only to such organisms as possess the fully developed power, or habit, of free movement, so definitions in general, in which both subject and predicate are quantified, the tension having ceased, are real, or possible, only to such natures as have realized the freedom which is defined. Science in general, as purely quantitative, has its psychological foundation in habit, freedom, perfected adjustment.

In conclusion, and with some repetition, the real judgment is always the consciousness ; it is not, as logicians and psychologists, even M.

Egger among the others, in spite of his coming so near to the truth, have usually imagined, the external sentence, which may interest the grammarian, but is sure to mislead the philosopher who looks no deeper. Language is no longer the heaven-sent blessing that we used to imagine it. But, secondly, the judgment in consciousness is a tension, a 'becoming,' which has its 'abstract' limit in the definition. The tension, finally, as between the abstract idea, or quality, one extreme of M. Egger's natural judgment, and the collective and substantial object, which contains within itself more or less precisely determined spatial relations of contiguity and quantity, and is the other extreme, ceases as the concept becomes realized in habit. Of course habit, as the realized concept, the acme of abstraction, is one and the same with definition; it sets or establishes the relations on which all science of the contiguous and quantitative rests.

A. H. Lloyd.

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PSYCHOLOGICAL LITERATURE.

Psychology: descriptive and explanatory. A treatise of the phenomena, laws, and development of human mental life. GEORGE TRUMBULL LADD. New York, Charles Scribner's Sons, 1894. 8vo. pp. xiii, 676.

The fairest way to judge this book would seem to be to take it as the middle section of a complete treatise on psychology of which the author's *Physiological Psychology* should stand for the first part. A 'psychology' planned on this scale is as yet unparalleled in literature, but there appears little reason to doubt that if the good years be accorded him, Prof. Ladd will complete the task. Not only is his characteristic untiring quality present in all the pages of this great volume, but it has a fresher style and spirit, it seems to us, than either the *Physiological Psychology* or the *Introduction to Philosophy*, and suggests a tide of energy more characteristic of morning, or at least of noonday, than of evening, in the writer's intellect. I begin by noticing this partial nature of the present work, because it is not advertised as prominently as it should be either on the title-page or in the preface; and many readers, finding it to give so little development to physiological conditions on the one hand, and to theoretical discussion on the other, may judge it defective, from failing to perceive that it is only, as it were, the second play of a psychological trilogy of which the crowning piece is yet to come.

The word 'descriptive' on the title-page covers more of the contents than the word 'explanatory.' For while the book is by far the most minute and copious description ever written of mental operations as they offer themselves to the merely introspective eye, it deals very little with what most people chiefly have in mind when they ask for 'explanation,' namely, with the logical grounds or the efficient causes of the facts described. This preponderatingly descriptive character also makes a summarized *compte rendu* both difficult and unprofitable. The author has almost no opportunity for original opinions sweeping enough to quote, and the faithfulness to detail, which is the

virtue to which he is mainly held, is demonstrable only by reading the original. Nevertheless I will attempt a brief notice of the course of his argument, before passing to what may be said in the way of criticism or appreciation.

Expressed in the broadest terms, Prof. Ladd's aim may be called the *unravelling of the fibres* of consciousness. Consciousness, like a rope, has for Prof. Ladd a fibrillated structure. Any portion of it which we may examine "is complex with an irreducible threefold complexity: . . . *it is fact of intellection, fact of feeling, fact of conation.* . . . One of these three 'aspects' may be emphasized, as it were, at the expense of the others; but no one of the three can be destroyed without destroying the psychic fact itself as an object of discriminating consciousness. . . . Each of the three . . . is peculiar in quality, unique, not to be confused with the others, or expressed in terms of the others. Intellection cannot be described in terms of feeling; neither can conation" (p. 58). Every concrete 'psychosis,' without exception, however one-sidedly one may for practical purposes name it, as an 'emotion,' a 'cognition,' or a 'volition,' is constituted of all three elementary kinds of fibre, inextricably interlaced. Yet in spite of this inner complexity every psychosis is a "living unity, . . . a marvellous and indescribable fulness of active life." And the whole series of these 'fields of consciousness' forms "a *continuum*, for the total expression of which the meagre separateness of processes and faculties seems a totally insufficient account" (p. 661). This continuity of development of the spiritual being always trebly living in this way is kept in view throughout the book. As in Spencer's psychology, every feature that is later evolved was germinally and nascently there already. "Out of the unconscious, somehow, does the conscious seem to come; the organization of mentality out of the confused and chaotic material of sensation and representation. Science can never put its finger on any definite moment and say, respecting the truly psychological, 'Now it is, for the first time, there!' Psychological investigation—no matter how, or how faithfully, conducted—cannot describe the mode in which elementary faculties come to be, without implying that they have already begun to do their work. But then this is not a disadvantage (if it be, indeed, a disadvantage at all) peculiar to psychology. Every physical science has to assume much more than this; it has certainly to assume formed conscious faculty as already at work; its universal formula is: *In the beginning was Mind, already equipped to see and hear and remember and imagine and think.*"

Experience unquestionably does evolve in this gradual way, so that we find faculties stealing so insidiously upon us that we know not how

they arose. An exposition that seeks, like Prof. Ladd's, to be almost as gradual as the facts, must throw away the old-fashioned sharp partitions; and although it may gain by this in veracity, it loses in distinctness and literary effect. For instance, just as an immense number of special affective, intellective, and conative fibres go to constitute by their several interlacements the three great primary strands of consciousness, so these strands, according to Prof. Ladd, interlace in the higher unity of the Self or Subject, which at the same time that it discriminates them from itself and from each other, also relates itself and them together. Yet in the chapter on 'Consciousness and Self-consciousness,' where all this is set forth in detail, I find it impossible to be sure from the text whether self-consciousness is said to be there from the start or not (cf. pp. 32–35). I find a similar difficulty in chapters VIII, XV, and XVI, which deal with the consciousness of space. The 'problem' here is to 'explain' how things come to be perceived outside of us and spread out and related to one another in space (321). "Strictly speaking," says Prof. Ladd, "what we are seeking has to be at some point in the course of our descriptive and explanatory science assumed as already existing. . . . At some point every investigator is obliged to confess that his data of explanation begin to fail him" (322). Just where this 'point' of realizing the distinctively spatial quality lies in the development of the mind the text does not make clear. 'Extensity,' as an original sensation-content, Prof. Ladd does not believe in (144, 151, 327, 353). All the space-determinations ultimately perceived grow up gradually "by a constructive and interpretative mental activity that has been developed through experience" and in which the influence of motor processes fusing with passive sensation-complexes plays the essential part. They steal upon us, in a word, unawares. Nevertheless at the successive stages of the 'stealing' they have a definitely objective form of some sort; and the really instructive thing for an inquiry like Prof. Ladd's would have been by a process of unwrapping, as it were, and peeling off the later layers of the finished space-intuition, to disclose to the reader what the successively earlier cores of it *felt like* when they were the last results achieved. The space at last so explicitly apprehended would thus be revealed in its nascency and implicitness. But the account which the book gives, minute as it is, hardly enlightens the reader at all in this respect.

Among the most original parts of the work are the chapters on Feeling and Emotion. Prof. Ladd disbelieves in all the current theories—as well indeed he may. Feeling is neither a cognition of the well- or ill-being of the organism under the stimulus, or of the ideas under each other's hindrance or furtherance, nor is it a matter of mere pleasure or

pain, without specific quality. *We feel, as well as know, the flow of the current of consciousness* (178), *the mind feels itself* (565), in countless individual ways that psychologically are inexplicable *ex alio*, although physiologically Prof. Ladd suggests instructively their condition. He finds it in the 'semi-chaotic surplus' of action set up in the brain-centres by stimulations and conditions that have not yet grown so consolidated as to occupy perfectly definite paths. This vague irradiation of currents forms "a *mélange* which gives conditions to one's affective disposition, or mood, or temporary impulse, so far as it is a matter of bodily feeling. When this *mélange* corresponds with that to which we are habitually accustomed, we feel 'like ourselves'; when it corresponds to any one of several familiar characteristic types, we feel in one of our several 'moods'; when it is largely unaccustomed, we feel 'queer' and 'not a bit like ourselves'" (175). It is consonant with this physiological view that Prof. Ladd should think lightly of the teleological function of pleasures and pains. The severer pains usually come too late to serve as effective warnings, and we must "confess that neither the existence nor the purpose of the definite amounts of pain and pleasure connected with certain activities of body and mind can be satisfactorily explained by psychology" (199). Of the emotions, too, "it is doubtful, taking all the facts of experience into the account, whether they are on the whole 'life-saving' and 'growth-promoting' functions of body and mind—in the merely biological meaning of the words 'life' and 'growth.' In the excessively intense form in which they all tend to recur, unless checked by the forces of an ideational and ethical development, the emotions expend life and hinder growth. . . . They are all significant of an 'overplus' which quickly becomes an 'overflow' of cerebral disturbance. . . . If the final purpose of life were merely to conserve and propagate itself, there would seem to be as little use for so many and strong emotions as for so much and such qualitatively varied pain. At this point psychology is compelled to hand over to ethical philosophy rather than to biology the larger problems started by the study of human feeling" (558). Between feelings, emotions, passions, and sentiments no sharp line can be drawn (199), it is merely a matter of the less or greater complexity of psychic elements in the *mélange*, and of the position of the emphasis. Prof. Ladd does not believe in the theory which would explain emotional feeling by the sensation of the 'bodily resonance' which the object or idea sets up. The resonance is due rather to the emotion itself (544), but its effects, returning to consciousness, reinforce and strengthen the original feeling and give it a ranker and more physical quality.—'Sentiments' are emotions with this coarse secondary accompaniment left out. The sentiment of

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the 'ought' is perhaps the most unique one of them all (583). It attaches to all acts judged *right;* but we have "no special faculty of 'conscience' as a matter of pronouncing judgments merely. . . . In making up the judgment [of right, or wrong], any amount of reasoning is admissible, for it is an affair of evidence more or less" (580–1).

The intellective processes are treated by our author in a peculiarly concrete and thorough fashion. Every ***real*** 'state' of mind being a state of knowledge, feeling, will, all three in each state (264), he keeps all the factors well in hand in his description. An 'idea' is 'life-like,' for example, just in proportion as the same feeling-tone and the same motor-impulsiveness cling to it which cling to the 'sensation' of which it is a copy (246).—In the stream of ideation he allows for automatic (or non-associative) processes by which irrelevant ideas may suggest themselves (260); and he considers that as an abstract principle of association 'similarity' can claim no legitimate place, contiguity being enough for the formulation of the facts (275–6). Where like suggests like, it is only because previous notice of the likness has already made the ideas contiguous. Thus the mind's discriminative, relational, and selective activity is both constantly deflecting the lines of experience and as constantly breaking up and remodelling what otherwise would be a passively unfolded associative content (290). From 'primary intellection' onwards Prof. Ladd traces this attentive, comparative, and synthetic activity which from the very first consciousness is aware of exerting upon its 'content.' It begins by noticing *resemblance*, and ends by the most elaborated rational thought. The higher intellective processes, memory, conception, judgment, reasoning, etc., are described with great wealth of detail, but our space forbids a *résumé*. The author's treatment of 'knowledge' is a little peculiar, and to us not quite clear. It is not conceived dualistically as a relation between the mind and a thing outside the mind, nor yet purely psychologically as a relation between conscious activity and its 'content.' It is a subjective fact (511), a mental procedure (512), described as a 'belief in reality' (513); but the reality is not as in Bain and Baldwin, e.g., the mind's 'object,' but a '*being*, existing in some state,' and "the specific character of this belief, in contrast with other beliefs, may be brought out by calling it 'metaphysical'" (513). Thus knowledge is a transcendent function, not an immanent content merely, but a function also immanent, since there would seem to go with it consciousness of itself. It seems as if Prof. Ladd ought to have led us either farther, or not quite so far into the puzzles of *Erkenntnisstheorie*.

The chapters on Conation, generally, including attention, impulse, instinct, desire, and will, strike me on the whole as being the best part

of the book. The account of the Will in particular is an admirable performance. Whether this be due to an insight more felicitous here than elsewhere on the author's part, or to the fact that the volitional life, with its hesitations, inhibitions, and decisions, has a dramatic character which lends itself easily to striking literary treatment, I know not, but I am sure that there has nowhere yet appeared a psychological account of volition as concrete and life-like as the one contained in chapter XXVI of this book. Volitions without effort have been described, and so have volitions with effort, by previous authors. It is strange that no one should have emphasized like Prof. Ladd the class of volitions with the exact *opposite* of effort. These, says he, "are marked by a wonderfully grateful sense of *relief*. The will to 'let go,' to 'surrender the struggle,' to 'yield to desire,' etc., are volitions of this sort. So also, in cases where deliberation has been long and painful, the making of the choice is characterized by the very opposite of the feeling of effort. Even where the task set by the volition is in itself a severe one, whether of obvious bodily movements or of the control of attention and the train of ideas, it seems lightened as it is voluntarily assumed—so conspicuous is the feeling of relief accompanying and following the resolution of the *nisus* and the perfecting of the deed of will" (615).

There are so many opinions concerning details expressed in Prof. Ladd's book that we make no pretence whatever of enumerating them. The vital thing about it is its consistent holding to the view that each individual mind is an organic life that develops its own destiny. This life, though integral, is complex, and conscious of itself, of its 'passions' (in the older sense of the word) and of its actions, in the same indivisible 'state' in which it is conscious of its 'objects' or 'content.' Its 'ideas' are not entities, any more than its 'faculties' are. *Its total self* is the only entitative reality; and all accounts of it by abstracted elements are mutilations and abridgments of the truth.

As regards the originality of this treatise, it is strictly true that it is *independent* from beginning to end. The period of assimilation is past for the author; the raw materials have been brought into solution, and have crystallized out again spontaneously and naturally in the form that characterizes his mind. In this sense his pages are mellow and alive, and full of native observation and expression of belief. But with all the concreteness, honesty, veracity, and shrewd humor that I find, I can, with the best will in the world, find no one idea or argument that abides with me as an unforgetable addition to the subject. What does strike me with the force of freshness is the amazing thoroughness with which Prof. Ladd realizes the intricacy of his facts.

It seems to me little short of wonderful that a man should be able to make so many subdivisions, and find so many distinct things to say on the descriptive level. In this sense he *is* original, for no one has yet attained to writing up the subject in as fine-grained a way as this. But to be perfectly frank—and here I fully realize that the critic writes down his own shortcomings even more plainly than those of the author on whom he presumes to animadvert with his subjective epithets—I find this whole descriptive sort of treatment *tedious* as few things can be tedious, tedious not as really hard things, like physics and chemistry, are tedious, but tedious as the throwing of feathers hour after hour is tedious; and I confess that when I think of the probable number of virgin-minded youths and maidens, hungry for spiritual food, who, through the length and breadth of this great land, will now certainly be led over all these pages of fine print merely to get back,

> "Statt der lebendigen Natur
> Da Gott den Menschen schuf hinein,"

all these terrific abstract words and sentences, I feel a sort of shudder at the violence done to human want. It is not that Ladd *quâ* Ladd is a tedious writer,—I could name many eminent psychologists who are more tedious to me than he,—but that mere description as such, mere translation into words of what we already possess in living fulness in our bosoms, is bound to be tedious under any circumstances. To speak more soberly, could not the words have been much fewer, and yet have contained all the abstract truth one needs to know?

These groans of mine no doubt proceed from the same idiosyncrasy that makes me demand that psychology shall be a 'science' in a sense different from that by which Prof. Ladd is satisfied. I desiderate 'conditions'; for Ladd 'analysis' and 'tracing of genesis and growth' are enough (p. 8). I cry for a 'Galileo or a Lavoisier' to lift us from this flat descriptive level, whilst my colleague says that he does not sympathize in the least with such "a confession of weakness—for example—because 'psychology is still in the condition of chemistry before Lavoisier,' nor look forward with the expectation that soon some Lavoisier will arise to rescue it from its depressed condition" (659). He thinks that all attempts to assimilate psychology to the other natural sciences are 'misleading' (*ibid.*). To me this lack of craving for insight into causes is most strange. Here is a flagrant mystery, that of the union of mind with brain, and we are apparently told that we must seek no reasons for it in a deeper insight into either factor!—told, in other words, that a mere narrative of the life of the spiritual being with its 'unique unity,' developing according to its

equally unique laws, is the uttermost ideal of research—for Prof. Ladd's contention is hardly distinguishable from this. To me, on the other hand, it seems as if 'methodologically' the crudest cerebralistic theories, or the wildest theosophic ones about the seven principles of human nature, lead in a more healthy direction than this contented resignation. And as the theories of inheritance have killed the taxonomic and biographic view of natural history by merely superseding it, and reduced the older books of classification to mere indexes, so will the descriptive psychologies be similarly superseded the moment some genuinely causal psycho-physic theory comes upon the stage. Not that they will be judged false, but that they will then seem insignificant. Alas that my learned Yale co-editor will not join with me in saying :

> "Ring out, ring out, *our* mournful rhymes,
> But ring the fuller minstrel in"!

W. J.

The Senses and the Intellect. A. BAIN. Fourth Edition. (To be published in April 1894.)

After a considerable interval of time, in the course of which psychological investigation and discussion, both in Europe and in America, has been more actively carried on than during any former period of philosophical history, I now, for the last time, re-issue this work, with such additions, modifications, and emendations as have commended themselves to my mind. I have endeavored to take full advantage of the numerous suggestions in contemporary philosophical literature, and, while adhering to the main points of doctrine, and the general plan of arrangement, I have introduced improved forms of statement, and corrected what I deemed either inaccurate or imperfect in the expression.

In regard to the physiological portions, the chapter on the Nervous System has been entirely rewritten. This task has been executed by Dr. W. Leslie Mackenzie, medical officer of health for the counties of Kirkcudbright and Wigton, who has spared no pains to embody the results of the latest authorities. I have profited by his assistance, also, in improving the physiology of the senses. My conviction of the propriety of bringing these topics before the student, notwithstanding the adverse opinion of many, has been strengthened rather than otherwise. It is not merely that the definitions and the doctrines of physiology have a direct application, and that their absence would make psychology poorer in its own province,—it is, further, that the expression of mental states is, in many ways, aided by reference to their physical

adjuncts. Even when such adjuncts are so imperfectly known as to have only a hypothetical rendering, the mention of them is still valuable in improving our scanty resources of subjective delineation. Perhaps it may be said that the student should refer to works of anatomy and physiology for this special instruction,—which is quite true. At the same time, the including of a suitable physiological selection in a treatise of psychology proper has high expository value.

It is now generally recognized that systematic psychology should be disburdened of metaphysics—that is, the problem of knowing and being—however closely they may be connected. To analyze subject and object is a strictly psychological task : the nature of our perception of a material world is something different and apart. Likewise what is now termed epistemology has psychological relationships, but is pursued into issues of a specific character, lying outside pure psychology.

The chapter on Instinct, which contains the fundamentals of pleasure and pain, together with their physical embodiment and expression, and the germ of volition, has been so far recast as to make more explicit the distinction between the physical and the mental, while assigning due force to each.

The supposed origination of our mental products, known to us only in their maturity, has entered largely into psychological inquiry. Whether certain fundamental conceptions—such as space, time, cause, the moral sense, the ego or personality—are instinctive, or grow out of experience and education, has long been the battle-ground of the philosophy of mind. The controversy may have a somewhat factitious importance ; at all events, it is regarded with more than merely speculative curiosity. The argumentative treatment, however, has assumed a new aspect from the doctrine of evolution, taken in the guarded form of the hereditary transmission of foregone aptitudes or acquirements. Instead of Kant's contention that the notion of space, as a 'form of thought,' is prior to any experience on the part of each individual, the question now is whether or not we possess at birth a large contribution towards the full realizing of the three dimensions of the extended world. Such a mode of looking at the problem changes the whole character of the research into origins ; depriving us of the right to define the absolute commencement of any of the great fundamental notions, and leaving us merely to watch their accessions of growth within the sphere of our observation, and to reason by analogy as to their probable course or manner of growth before entering that sphere. It may, however, be still argued without fear of rejoinder, that experience or acquisition is the remote genesis of what transcends our avail-

able sources of knowledge. The qualifications introduced in the present edition of this work, having reference to experience as opposed to instinct, have taken shape in accordance with the leading hypothesis above sketched.

The plan and object of the present work, as well as of its continuation, *The Emotions and the Will*, having been conceived more exclusively with a view to practical results, I have seen no ground for materially altering the expository order and the proportions, in the laying out of the details.

The retentive power of the mind, which occupies the largest division of the intellectual powers, has received some additions, with a view to elucidate still further the more complex bearings of the recuperative process.

I recognize, in the broadest sense, the possibility of advancing psychological doctrines by means of well-contrived experiments. The researches usually called psycho-physical have already borne some fruits, and hold out still greater expectations for the future. They can, at best, cover but a small portion of the wide domain of psychological research ; but, if pursued with a clear recognition of introspective concurrence, they may accelerate the pace of psychological investigation, more especially on the side of practical usefulness.

The account of the psychology of Aristotle, contributed by Grote to the previous edition, having been embodied in his own posthumous work on Aristotle, is here omitted.

Subsequently to the publication of the former edition, I appended a postscript, containing a minute and exhaustive criticism of the psychological parts of Darwin on Expression. This has been retained in the present edition. It serves the purpose of expanding the treatment in the text, and also of illustrating at length the alternative positions as to the respective priority of emotion and volition in the order of development. [Preface.] A. BAIN.

ABERDEEN.

Grundriss der Psychologie. O. KÜLPE. Leipzig, Engelmann, 1893. pp. 478.

The psychological literature in Germany has shown during recent years a surprising lack of comprehensive expositions. While the English literature has produced the works of James, Sully, Ladd, Baldwin, Dewey, and others, Germany has only a few corresponding books. Appearances indicate, however, that a change will soon come. Psychologies by Külpe, G. E. Müller, and Ebbinghaus are announced, and, as it may be expected that all these works will be quite modern and

yet written from very different standpoints, the blank will be filled in a short time and in the most desirable way. The book by Külpe is now in our hands, and it may be said at the outset that it is a very original, valuable, and suggestive contribution to modern psychology.

The chief part (400 pages) of the work is divided into two halves, the first giving the elements of consciousness, the second treating the combinations of psychical elements. Besides this main part, thirty pages on the purpose, methods, and literature of psychology form the beginning of the book, and thirty pages at the end are taken up with states of consciousness. The part on the psychical elements is then divided into a larger chapter on sensations and a smaller on feelings, while the part on combinations (Verbindungen) is divided into fusions (Verschmelzungen) and connections (Verknüpfungen).

The first principal division, then, discusses sensations. Their classification is made from a purely physiological standpoint; all other points of view are expressly rejected. Sensations are those simple processes of consciousness which are in the relation of dependence upon special nerve-organs, and the first appearance of which needs the stimulation of peripheral organs. As the latter is not necessary for subsequent repetitions, the sensations are classified into such as are produced by peripheral stimulation and such as are of central origin only. These sensations are separated into groups merely by the difference of the sense-organs. For instance, the skin sensations are only one group, since we do not know the anatomical differences between the organs for touch sensations and those for temperature sensations; if we knew these anatomical differences, these sensations would make up two different groups.

A sensation can have four primary characteristics: quality, intensity, extension, and duration; on the other hand, the tone of feeling is not a property of the sensation itself. Only quality and duration are characteristic for every sensation; extension belongs only to optical and tactual sensations, and intensity is wanting in optical sensations, since all the variations of the intensities of optical stimuli produce variations of quality. The optical sensations are therefore not mentioned at all in the whole chapter on intensities and on Weber's law, but the questions relating to them are discussed in the extremely original part on the quality of visual sensations. In the following chapter on sensations of central origin not only their qualities and immediate presuppositions are discussed, but also the general conditions of their existence, especially memory and imagination. A valuable criticism of the doctrine of association and a discussion of the motives and of the exactness of reproduction are here in the fore-

ground. Külpe here brings forward a dynamic theory as opposed to the usual cell theory of association-paths ; it is not on the difference of anatomical relations, but on the difference of physiological functions, that the associative relations are based.

For the second group of psychical elements, the feelings, the possibility of a classification is denied. A detailed treatment is given to the elementary æsthetic feelings, which are interpreted as resulting from the relation of the perceived impression to the reproductions which it suggests. As a physiological condition for the feelings special central processes are presupposed. Opposition is made to the existence of a psychical element which corresponds to the will ; the processes of the will are represented in consciousness by sensations and feelings only.

The second part, which treats the combinations of psychical elements, describes them from the point of view which considers whether the elements in the combination fuse or not. A fusion exists especially for sounds, but also for light and color-tone, and finally in emotions and impulses. Emotions and impulses are all those states in which a fusion of sensations and feelings exists. In the objective emotions the bodily sensations preponderate, in the subjective the feelings, while in the impulses those sensations are predominant which result from the movements that correspond to the feelings. Those psychical combinations which are not in a state of fusion are mere connections. From this point of view the connections in space and time are studied and the extension and duration of sensations and their relations in space and time examined with much force. As extension and duration are just as much properties of the sensation as quality and intensity, the task is only to show the dependence of the detailed spatial and temporal factors upon our psycho-physical organization. The problem of space, which is reduced to the problem of extension and distance, is discussed at first for the tactual sense and then for the eye. Particularly is the attempt made to prove that the idea of space is independent of the movements of the eyes. The problem of time leads to a discussion of the duration of sensations, of the comparison of intervals, and of temporal order and frequency Next come the special mutual relations of elements which are connected in space and time. In the field of space the contrast of light sensations is emphasized, in the field of time the processes of simple and complicated reaction. Finally the last chapter discusses the state of attention, which is interpreted as a psycho-physical condition of inhibition.

This short review is unable on the one hand to do justice to the

richness of valuable details, or on the other hand to accentuate all those points which to most psychologists will appear debatable or absolutely untenable. But even this glimpse of the book makes clear its principal points of weakness. As such I consider above all the narrow limitation of the material. The book is not a psychology, but only the middle part of a psychology. The book treats the psychical elements and the forms of their combination, but we miss on the one hand the description of the special combinations and on the other hand a general discussion of fundamental psychological notions. The book appears to me like the second volume of a psychology of three volumes, the first volume of which was to have discussed the general problems and the third the special presentations, judgments, emotions, will, personality. I miss especially a thorough treatment of those questions which are on the borderland between psychology and epistemology. To be sure Külpe is not at all one of those who consider a detailed discussion of epistemological problems superfluous, but all that he offers in this book is in a way left unfinished and indecisive (for instance, in the question how far a causal connection of psychical facts as such can exist at all) or, when it comes to a definite statement, often entirely erroneous. For instance, consciousness itself is, according to Külpe, given in space and time because it has the sensations of duration and extension, and the difference between the physical and the psychical world is that, while both are experiences, only the psychical experiences are dependent upon our psycho-physical organization. It seems to me that both worlds are experiences from an epistemological standpoint, but from this standpoint no psycho-physical organism exists; on the other hand, from the standpoint of empiricism, which is presupposed in the acknowledgment of a psycho-physical organization, the physical processes are not at all experiences, but processes that are independent of experience.

If we confine ourselves to those questions of psychology which are really discussed, the general plan seems to suffer especially from the classification of the material. I think it wrong to classify the sensations from a purely physiological point of view, and to explain the whole doctrine of association, memory, imagination in the chapter which describes the characteristics of reproduced sensations. Above all I regard it impossible to treat all the complex phenomena from the standpoint of fusion. To be sure the notion of fusion is of highest importance, but it cannot be the basis of a classification. Notwithstanding the fact that Külpe gives only types of fusing and non-fusing combinations, each group contains entirely different things, while often the

closest relations are severed. Harmony belongs to one main division, the sequence of sounds to the other, and so forth.

In regard to details, most erroneous of all seems to me the way in which he combats the doctrines of associationism. His own account of the facts suggests nothing else than a purified associationism. But in the place of this he tries to substitute a psycho-physical theory which gives up the advantages of associationism without gaining anything. It seems to me that Külpe does not recognize clearly enough the real difficulties. For instance, attention, which it seems to me he regards in the only right way as an inhibitory function, cannot be explained according to Külpe by the mutual influence of psychical elements, but only by the help of a special inhibitory organ. The very difficulty is indeed to explain how the functions of this organ are continually under the influence of psychical motives; the inhibiting organ should have again a special brain at its disposal. In any case the simpler theory seems to be that the inhibitions result directly from the action of the psycho-physical elements. In a similar way I do not see what the dynamic theory of association can substitute for the theory of separate association-paths. Külpe is right in saying that the sensorial centres are dependent upon the sense-organs just as the muscles are dependent upon the motor centres. But that very fact opposes his theory. A succession of muscular movements results solely from a succession of central motor impulses. The corresponding fact would be that central sensorial processes follow one another only when successive peripheral stimuli are given. But the question of association is exactly this—how central sensorial processes can succeed each other when no peripheral stimulations are given. Between muscle and muscle, therefore, no direct connection is necessary, while the presupposition of a connection between the central sensory organs is the only possibility of a psycho-physical explanation, and such connection is possible only if the different psychical qualities correspond to local differences in the central system. Besides this a difference of elementary central function, corresponding to the different muscular actions, is acknowledged by the usual theories to exist in the varying intensity of sensation. The weakest part of the book seems to me the chapter on space. It is to be regretted that Külpe makes too little use of the non-German, especially of the English, literature.

More important, however, than pointing out the failings of the book is, it seems to me, the mention of its essential merits. As especially good I regard the chapters on the conditions and measurement of sensibility, on the quality of visual sensations, on the fusion of tones, on the qualities of the will, on the emotions, and on reaction. But in addition to the

single sections I must mention certain general characteristics which are predominant in the entire work and which are especially important for psychologists. The book is extremely clear. The reader always knows exactly what Külpe means. In the second place it is always consistent in the use of the various conceptions; the conceptions are not worked up differently for the various chapters, but are resolutely retained, although the problems themselves are not always as resolutely thought out to the finish. In the third place Külpe knows exceedingly well how to separate the essential from the unessential, and how to save the reader from the latter. With the exception of the methods for measuring sensations, the treatment of which is too extended, the choice of subjects seems to me excellent. Even Hipp's chronoscope is not mentioned in the whole book. In all these respects the book seems to me to far surpass Wundt's treatment of the same fields. In other respects also Külpe's book is thoroughly original and independent. This appears first in the classification of the material and is seen on nearly every page. The book has nothing in common with a mechanical textbook. It has a thoroughly individual character, and no psychologist can afford to ignore it.

Unfortunately I am forced by the state of affairs to add a word in regard to a more formal aspect of the book. Heretofore Külpe has appeared mostly as a critic merely, partly in critical articles, and partly as a regular critic in the *Literarisches Centralblatt.* Even in the present book Külpe the critic makes himself strongly felt, often more by what he openly ignores than by what he attacks. Külpe's method of criticism, however, deserves the severest censure. To be sure he did not invent the method, it has grown up with the *Philosophische Studien*, and many younger members of the Leipzig school thoroughly concur with Külpe in this misuse of criticism. The essential feature of this method consists in the ability to act as if there is nothing but light in the writings of friends and nothing but darkness in the writings of opponents, although in both light and shadow may be equally divided; but above all in making a personal mention of friends only when agreeing with them and in bringing in opponents only when attacking them. If one reads Külpe's writings and criticisms, one learns, e.g., that Wundt and I represent the extremes of psychology, in the sense that Wundt, whose assistant Külpe is and to whom the book is dedicated and with whose praise the book is full, represents the highest point; while I, who have written only the most pitiable trifles, which are really worthy of no serious criticism, represent the lowest point of weakness in psychological literature. Whoever examines the contents of the book seriously finds that, with the possible exception of the doctrine of movements of

expression, Külpe is really never in agreement with Wundt. Indeed the whole book is an energetic and, with the exception of the doctrine of space, a decidedly successful struggle against Wundt. On the other hand I am pleased to see that Külpe agrees with me in the most essential points and is now in harmony with me even on those questions in which not long ago he opposed my standpoint in a most unfriendly manner. To be sure such unjustifiable attacks trouble me (and probably everybody) personally very little. But in the interests of science it cannot be too energetically pointed out how much science must suffer when scientific and personal matters are confused. Of course I could easily have made use here of the same method and could without trouble have brought together everything in Külpe's book that is to be criticised and passed over in silence all that deserves praise. Instead of this I emphasize with great pleasure my belief that Külpe's book is one of the best psychological productions of recent years, and express my hope that an English translation will soon be forthcoming. H. M.

Psychologie des Erkennens vom empirischen Standpunkte. GOSWIN K. UPHUES. Erster Band. Engelmann, Leipzig, 1893. 8vo, pp. 318.

We are glad to welcome a new book by Professor Uphues, and are not disappointed in our expectations of finding it learned and thoughtful, as are his others. I need not here speak of his earlier works, which are so well known that to do so would be superfluous. Before plunging, however, into a criticism of his 'Psychology of Cognition,' it may not be amiss for me to mention (as it can hardly be known except to those directly interested in education) his extreme kindness to our American students who have wandered abroad in search of philosophical culture—a kindness which has laid not only those who have profited by it, but also their teachers, under no small obligation. Those who are acquainted with the facts to which I make this passing reference will feel quite as much indebted to him for his labors in this direction as for his literary productions, for we still believe on this side of the water that it is the function of a teacher to teach, and that time spent in opening a path for younger scholars is by no means time lost.

The volume before us is largely taken up with the problem of perception and the genesis of our idea of an external world. In the preface we are promised a second volume, which is to treat of the judgment.

Prof. Uphues rightly distinguishes between psychology and metaphysic; and maintains that in the former we study merely mental

states, and are justified in putting to one side, as belonging to another discipline, what has been regarded as their implication, a 'transcendent,' an external correlate which is represented by them or in them, but which is itself wholly distinct from them and beyond them. The question of the existence or non-existence of such a 'transcendent' he thinks must be relegated to metaphysics, but the fact that we do have states of consciousness which we must regard as 'images' of a transcendent he accepts as a purely psychological fact, and one which must be reckoned with in any scientific investigation of cognition.

"The scientific investigation of knowledge has, hence, first of all to fix its attention upon knowledge of the transcendent. One may here raise the question whether we really know the transcendent—the question as to the truth of our knowledge of the transcendent; and it is only in the answer to this question that we can find an answer to the questions concerning the possibility of a knowledge of the transcendent, and concerning the existence of the transcendent. All these questions are metaphysical and have to do with the transcendent which constitutes the object of metaphysics. But one may also raise the question, how this knowledge of the transcendent is effected, making complete abstraction from the questions whether this knowledge is a true or merely a seeming knowledge of the transcendent, whether knowledge of the transcendent is possible, and whether a transcendent exists. This question of psychological fact constitutes the object of the psychology of cognition. Knowledge of the transcendent presents itself to us immediately as a conscious state, and thus as an image of the transcendent. To this we can and must hold fast, even if there be no transcendent, if a knowledge of the transcendent be for us impossible, or if our knowledge of the transcendent lacks all truth and is a mere semblance of knowledge. That our knowledge of the transcendent is in this sense an image of the transcendent is a fact of consciousness which no one can deny. An image is an image only in virtue of its correspondence or agreement with something; but the thing need not be real, it may be fictitious" (§ 45).

In every percept we are thus concerned with the transcendent, and our percept is *of* something external, it has objective reference. Metaphysic may decide there is no such external object, but our percept remains what it is, and still *seems* to be a knowledge of such an object. What this transcendent may be Prof. Uphues does not attempt to state. In analyzing our percepts he distinguishes between the impenetrability of an object and all its other qualities, reserving to the former the name 'thing.' He recognizes that the whole object as known (the 'thing' with its qualities) is a complex in consciousness, and contains

no element which may not be described as a consciousness element. Nevertheless the percept is *of* the transcendent, and in it the transcendent somehow 'comes to consciousness.' I shall cite one more passage, which brings out clearly his position and contrasts it with others:

"In psychology we leave it wholly undetermined whether transcendental objects exist or not, and that not merely as regards objects which are not things, but also as regards things. For us, things and objects that are not things stand in this respect upon precisely the same plane, in contrast to the assumption of the common consciousness, which regards the sense of touch, in so far as it gives us information about things, as peculiarly the sense through which we gain a knowledge of *reality*. Our view is in contrast also to that of many philosophers, according to whom things and things only constitute the unknowable transcendent, while objects that are not things are merely immanent. It is in contrast, finally, to the view accepted in natural science, which distinguishes between the mechanical and mathematical and the 'secondary' qualities. According to it, the secondary qualities are subjective, that is, they are in themselves only sensations, while the mathematical (the extension, at least) and certainly the mechanical (resistance, density, weight) pass as objective, as the transcendent, real, so-called mechanical correlates of the secondary qualities. For us, all these qualities, the mechanical and mathematical as well as the secondary, are primarily sensations in which we represent to ourselves something transcendent, and which in so far constitute an expression of the transcendent, that is, of a something which is not a state of consciousness. I say primarily, for, since for our consciousness the sensations are inseparable from the qualities, the latter form the first element in the concept of the former. Yet the names which we give to the qualities can, properly and strictly, only apply to the transcendent, and hence we can best define the qualities as the transcendent, of which we become conscious in these sensations" (§ 97).

Thus we see that the external world is for Prof. Uphues simply a transcendent, a something closely resembling the Unknowable of Mr. Spencer. Locke's distinction between the primary and secondary qualities of bodies is not ignored, but the difference is not made to lie in the fact that certain qualities have external correlates while others have not. All qualities alike are, from one point of view, states of consciousness, and the only thing beyond states of consciousness is this vague and indefinite transcendent. States of consciousness and qualities are not distinct things, but the same thing regarded from dif-

ferent points of view. The statement that the names we give to the qualities can, strictly speaking, apply only to the transcendent must not be taken as favoring the Lockian view that qualities can exist beyond consciousness. It rests upon the familiar fact that we all speak of *things* as round, hard, heavy, colored, and never so speak of the *ideas* of the things. This fact is undisputed, and it has, of course, its significance, but one may well question whether the average man in so speaking ever dreams that he is applying his adjectives to a transcendent of the sort accepted by Prof. Uphues. His thought is probably much more in harmony with that of Locke, who held substantially the view accepted in natural science. If one accept external correlates to percepts—bundles of real qualities, so to speak, in a real external world—one may mean something definite in saying that external things are round, hard, and heavy; but if one hold that all roundness, hardness, and heaviness must be found in consciousness, and that no determinations can be given to what is beyond, it does not seem to mean anything in particular to say that the transcendent is round, hard, and heavy. One may thus express, if one choose, the belief that round, hard, and heavy are in consciousness, and that there is a transcendent without, but it does not appear to add to the thought to call the former an 'expression' of the latter.

In thus abandoning the natural-science point of view, Prof. Uphues has, it seems to me, abandoned the psychological standpoint and passed over to the metaphysical. He does, as we have seen, distinguish between psychology and metaphysics, and leave to the latter all questions relating to the existence of the transcendent and the way in which we come to know it. But he keeps his transcendent in psychology as a seeming at least,—it comes to consciousness (whether it exist or not), and its coming to consciousness is what makes certain mental states *knowledge*. I cannot but think, however, that this transcendent, which is grasped through sensations, and which is in no sense an external world as it exists either to common thought or to science —I cannot but think that this has no place in psychology at all, and that it must not be used to distinguish between some mental states and others. I have so lately printed in this Review a discussion of the psychological standpoint that I need not enter at length into the question here. Suffice it to say that the position taken by the psychologist appears to me to be substantially the same as that taken by the student of natural science, who accepts unquestioningly a real external world; not the world of a vague and indefinite transcendent, a *Ding an sich*, but the phenomenal world of matter and motion. The psychologist distinguishes between things in such a world and his ideas of them,

regarding the latter as in some sense copies or representatives of the former. To him the copy and the original are not one thing looked at in two different ways, but two distinct things. With a transcendent underlying the external thing—the phenomenal thing—he has, as psychologist, nothing to do.

Prof. Uphues does not, as the citations given above show, accept this distinction between the thing as a bundle of qualities and the idea of the thing as a representative of this. In the conscious states we are to find both ideas and qualities, the distinction being rather a logical than a real one. Nothing lies beyond consciousness but the transcendent, and this is a mere postulate (§ 54) and in no sense contained in sensations (§ 78). Yet conscious states are to be distinguished as 'grasping' or not 'grasping the transcendent. What does this mean? It cannot mean simply that the mental states in themselves considered differ from each other, and mean no more than that. If that be all, why bring in the transcendent? What has a transcendent to do with the matter? The fact is that Prof. Uphues, after drawing a clear line between conscious states and a transcendent beyond them, overlooks the division and really makes the conscious states reach across and appropriate what is beyond. The language that he uses would almost unavoidably lead him to forget from time to time that the two spheres of being are supposed to be quite cut off from one another. He speaks of conscious states as 'directed to' the transcendent (§ 7), and of the transcendent as 'coming to consciousness' in sensations (§§ 37, 67, 75); it is a fact of consciousness that knowledge of the transcendent is an image of the transcendent (§ 45); some knowledge is consciousness of an object beyond consciousness (§§ 71, 72); perception is a representation of the transcendent in sensations (§ 74); both perceptions and ideas are directed to transcendent objects, and in both cases the objects are *really present* to consciousness (§ 79); the transcendent is grasped in its expression in consciousness, and is, in perception, inseparable from its expression, the percept (§ 77). In speaking thus it certainly seems to me that Prof. Uphues either drags the transcendent into consciousness, or allows consciousness to transcend itself and go out to the transcendent in some (to me) incomprehensible way. If the use of these expressions be justifiable, I do not see the need of a metaphysical postulate to guarantee us the existence of this transcendent. We are conscious of it, and what more do we want? But then, if we are really conscious of it, it is not a transcendent at all, and the distinguishing mark of a percept must not lie in its reference to a something beyond consciousness.

It may be objected that the psychological position, as I understand

it, and as, I think, it is generally understood, admits one's right to thus reach beyond a conscious state and relate it to its object. This is true. But there is an important difference between referring a percept to its external correlative as one does in psychology, and referring it to a transcendent of the sort accepted by Prof. Uphues. The external world accepted by the psychologist is in no sense regarded as a postulate, a something *merely* assumed and for the existence of which no direct evidence is forthcoming. On the contrary it is held to be given in experience, and the psychologist's reasonings concerning his own mind and other minds proceed upon the assumption that it is so given. The psychologist who infers from the actions of another man's body the ideas in the other man's mind assumes that he perceives the other man's body, and he does not merely postulate it as a metaphysical entity underlying what he really perceives. And he feels justified in passing from the actions in question to the ideas they are supposed to reveal, because he regards himself as having direct experience of a connection of ideas with bodily expressions in the case of his own body. When he goes on to the conclusion that every consciousness is shut up to the circle of its own ideas, and can have no direct and immediate knowledge of anything beyond, he undoubtedly maintains what is inconsistent with his primary assumption, i.e., that he has direct evidence of the existence of his own body and other bodies. This inconsistency I do not think it is incumbent upon him as a psychologist to remove. He may leave it to the epistemologist. What is important to note here is that the psychologist, having drawn a distinction between ideas and external things, does not regard the things —the external correlates—as merely postulates, but bases his notion of the correspondence of idea and thing upon experience. He may say that any particular man cannot know whether his supposed percepts are really percepts or mere hallucinations, but his whole construction demands that both *percept* and *thing* be given in experience somewhere, and to some one, for all his reasoning is based upon such an assumption. With a transcendent which can only be gained by 'the leap of a postulate' the psychologist, as such, has nothing to do; its title is vested in the metaphysician.

It is because Prof. Uphues abandons the natural-science standpoint, and reduces his external world to a transcendent of this description, that I have accused him of leaving psychology for metaphysic. However, the position he takes is not an uncommon one, and he is in good company where he is. He certainly intrenches himself with skill in his position.

So much for the main thesis of the book. have criticised it with-

out turning aside to pay the author merited but unnecessary compliments—merited, because the volume contains so much that must seem admirable even to one who dissents from the doctrine it contains; and unnecessary, because one knows what to expect in a volume from Prof. Uphues' pen. We anticipate with pleasure the publication of his second volume, and also that of the *Psychology of Volition* which he has announced. G. S. F.

Appearance and Reality: a Metaphysical Essay. By F. H. BRADLEY. London, Swan Sonnenschein & Co., 1893. pp. xxiv, 558.

The humorous aphorism 'once an advanced thinker, always an advanced thinker' is one of Mr. Bradley's titles to fame. This book is another. It is among the solidest of the contributions to philosophy in recent years. It is reasoned with a minuteness that is quite Teutonic—it is a pleasure to read an author who so bristles with points. Unhappily the book is, for the same reason, difficult in any brief space to review.

Appearance and Reality is a constructive argument for the Absolute, with answers to objections. In the barest outline Mr. Bradley's main position is this: experience (which is co-extensive with consciousness) is a maze of inconsistency, so far at least as any finite individual knows it. It is not therefore reality, but appearance merely; for reality must be consistent—*that* is its distinguishing mark. But on the contrary all experience must be reality, and reality is one. Hence the problem, how can a consistent whole be formed of parts that are inconsistent? The solution is in principle striking by its lack of novelty: the inconsistency in the parts is perceived upon but a partial view; a complete view might well show a perfect harmony. But since this harmony must exist, and since it is not impossible that it should exist, therefore it does exist, though how it can, passes human understanding.

That all experience as finite individuals find it is a maze of inconsistency, is too large a subject to be dealt with here. Mr. Bradley handles it under a dozen such commanding heads as Relation and Quality, Space and Time, Causation, Activity. I shall simply say that on his own premises his treatment is strong; but havoc might be made among his premises. The next point, however, is compact—something may be done with it. It is that consistency is the distinguishing trait of reality. We should suppose just the contrary—we require proof of that. Since all experience, as we know it, has just been proved inconsistent, and since it is undoubtedly real, the natural presumption would be that some reality, maybe all, is inconsistent. Mr. Bradley's reply is (p. 136) that reality must be consistent because we have all along as-

sumed that it is. This sort of proof by previous assumption is not infrequent in the book. Mr. Bradley adds (pp. 136–7) that we are obliged to assume it—that either in endeavoring to deny it, or even in attempting to doubt it, we assume it, tacitly.

That one cannot help assuming a thing is ample *cause* for assuming it, but is not a warrant in logic for doing so. That one cannot doubt a thing without assuming it may in point of logic be the best of grounds for pushing doubt to the extreme. Those who urge the contrary are singularly short-sighted. Their stock example is the reply to the sceptic. "You try," they say, "to prove that human faculties are incapable of knowledge, and employ them to do so. But if they are incapable of knowledge, your conclusion cannot be true." "That is just the point," says the sceptic; "if human faculties lead to conclusions which cannot be true, they confess themselves unsound—they commit suicide." Mr. Bradley's reality confesses itself unsound—commits suicide. All reality we were told is consistent, and all experience is reality. Holding fast by these two assumptions, we reached a conclusion which contradicts them—viz., that experience is inconsistent. It would seem that we must doubt some part of our assumption. Either reality is not consistent or experience is not reality. Mr. Bradley finds it more logical to cling the more closely to the assumption which has failed him. I assumed it all along, he says; I cannot abandon it now. It must be true, for—it has proved contradictory. "What can be more irrational," asks Mr. Bradley farther down the page (137), "than to try to prove that a principle is doubtful, when the proof through every step rests on its unconditional truth?" One should rather ask, what can be more irrational than to cling to a principle the consistent assumption of which leads to its contradictory?

But Mr. Bradley anticipates this turn—to do him justice there are few turns which he has not anticipated. What he says in bar of your objections may not satisfy you—it may be merely a reference, a word, curt as you please—but he has at least anticipated you—considered the matter your way. He has done so here. "It would, of course, not be irrational," he says (p. 137), "to take one's stand on this criterion (of consistency), to use it to produce a conclusion hostile to itself, and to urge that therefore our whole knowledge is self-destructive, since it essentially drives us to what we cannot accept. But this is not the result which our supposed objector has in view, or would welcome. . . . He is not prepared to give up his own psychological knowledge, which knowledge plainly is ruined if the criterion is *not* absolute."

But I do not understand that this is the alternative. It is quite

true that if the criterion of consistency is not absolute, one's knowledge of psychology and of everything else is logically bankrupt, but no Humean (and the objector may well be a follower of Hume) ever supposed that his knowledge was logically sound. Science, the Humean would say, does not pretend to logical soundness—it accepts the human faculties; the basis of science in the last resort is not logical but psychological—that is the very point of departure that science makes with metaphysic. Metaphysic must be logically sound, science need not. Metaphysic cannot say—"Men think thus and so, it is the very nature of their faculties to assume such and such, therefore such and such shall be unquestioned." All other branches of knowledge do that—it is the distinction of metaphysic to do otherwise, to be more thorough, to question all presuppositions, to be logical or nothing. Science says to the intellect—'You are a laborer—work for me.' Metaphysic interposes and adds—'Perhaps you are a mountebank—come, lift yourself by your boot-straps.' The ambitious clown tries and fails. 'Away,' says Metaphysic, in derision, 'I will have nothing to do with you.' 'But I will,' Science says. 'But he can't lift himself by his boot-straps,' says Metaphysic in the person of Mr. Bradley. 'I don't require,' Science may reply, 'that he should. He is not perfect, but he's the best I can get, and I'm accustomed to put up with him.'

About the unity of the Absolute Mr. Bradley's remarks are too voluminous to be dealt with here. One may however say something of a single paragraph (pp. 141–2). He affirms that to be many is to be related, and to be related is to be dependent. One is moved to wonder whether Mr. Bradley ever settled in his own mind what he means by the Absolute: whether he means the utterly independent or that which is capable of being so; that which has no relations or that which need have none; that which actually is not relative or that merely which is not necessarily so. The first is of course a mere knot of contradictions—one cannot even declare it incomprehensible without making it relative as an object of curiosity, or speech, or uncertainty, or what you will. If it is for the Absolute in this sense that he is arguing, his reasoning refutes itself—the mere fact that he reasons about it at all destroys his conclusion. But if by Absolute he means the essentially independent, then his argument does not hold. One's own consciousness and that of some one—say in Central Africa—may be two and be essentially independent of one another. Things in relation do not necessarily cease to be absolute in the sense of independent. There are many relations in which the terms are independent of each other and of the relation, and in which the relation alone is dependent. X's consciousness is like mine, let us suppose, but I have never seen

nor heard of X, nor X of me. In what sense is my consciousness dependent on his or on the likeness it bears to mine? No alteration in his consciousness will affect mine—it may even be destroyed, and mine will rest unchanged. There was no sign in mine of the relation while it lasted, there is no sign now that the relation is gone—in what sense did its existence make my consciousness dependent? In the sense that, as an object similar to something else, my consciousness varied with its variations, and with its destruction was destroyed? But my consciousness varied not at all and suffered no destruction; it was the relation only that varied and was destroyed—what better proof could be asked that my consciousness was independent, and that what was not independent was the relation? A change in either of the terms alters the relation—the relation can be altered in no other way; but a change in the relation has no influence on the terms.

But I confine myself, you will say, to my own consciousness. It is quite true that within that bound my consciousness does not vary with X's and with the relation that X's bears to mine. But I forget that it is not in my mind that the relation exists; it exists only in the mind of some third person, who knows both my consciousness and X's and their similarity; and that in that person's mind my consciousness does vary with X's and with the relation that X's bears to mine. To that person my consciousness is one thing while the relation lasts, and quite a different thing the instant the relation is changed; to that person my consciousness is at first a thing similar to X's, and afterwards a thing dissimilar to X's. But to this there is a very plain reply. It is an example of the psychologist's fallacy—it attributes to either term of the relation what belongs only to the thinker that knows them both. Within the bounds of my consciousness it was admitted that no change in my consciousness took place; but it did take place in the mind of a third person. Can a change in my consciousness take place outside of my consciousness?

But Mr. Bradley thinks that the mere fact that my mind and X's are known by a third would make them dependent. "If it [the mind] is known by another, then forthwith it cannot be self-existent, since this relation must clearly belong to its essence" (p. 143). Who was it said that when a metaphysician assumes what he cannot justify he states it with 'clearly'? A mind's existence is in no sense conditional upon its being known to another mind. It is enough if it knows itself. Whether it is known by another is the least essential of accidents—and in any strict sense one mind cannot be known by another; it can at most only be inferred or perhaps merely imagined.

But this, it will be said, destroys the possibility of minds being in

relation at all—being similar, or different, or many; for, to be at all, a relation must be known, and how can it be known unless both its terms are in one mind? Let it rather be said that this destroys the notion that a relation to be at all must be known. "Plurality has no meaning unless the units are somehow taken up together," says Mr. Bradley (p. 141); it is quite sufficient, I reply, that they be capable of being taken up together—that my mind and X's are two, whether they are ever known to be so or not, providing they are capable of being known to be so (and capable, it may be, only through the defective medium of mental representations). In a word, the principle that *esse* is *percipi* does not apply to relations; to perceive that two things are different works no alteration in the things; if they are numerically different now, and have not changed from what they were before they were perceived to be so, they were numerically different then.

I cannot of course stay to justify this position in detail. Indeed my remarks have already taken on proportions that will tempt the editorial Procrustes, and yet there was another word I thought I should have room to say. "A separate real which is wholly self-dependent must . . . fall entirely beyond our knowledge. We have therefore no ground and hence no right to suppose it possible," says Mr. Bradley (p. 142). But this complaisant premise permits itself to be contradicted twenty times on the pages following. On every step in the argument for a wider harmony in which contradictions are reconciled, Mr. Bradley is perpetually telling us—"we don't know how—it is quite beyond our knowledge—but since it is not *im*possible, we must affirm it." But apart from this admission the fact is not obscure. It is quite beyond my knowledge that there are other minds than my own—my belief that they exist is founded on evidence confessedly inconclusive, worked up by a process of inference which is psychologically unavoidable and logically ridiculous. I cannot help making the guess, but I know it is a leap in the dark. Does Mr. Bradley mean to say that it is not only not proved that other minds than mine exist, but is impossible? "But if the being," he says (p. 142), "exists outside of all knowledge, assuredly *to us* it can be nothing." To us assuredly, but not to itself? "If it knows itself as what it is, then, since it falls within itself, it so far is the universe, and certainly is not [*so far?*] one being among others" (pp. 142–3). If Mr. Bradley would add the words I have inserted in brackets, one might admit this, but where would his argument be?

A. L. HODDER.

THE DISCUSSION BETWEEN SPENCER AND WEISMANN.

The Inadequacy of 'Natural Selection': Professor Weismann's Theories: A Rejoinder to Professor Weismann. HERBERT SPENCER. Contemporary Review, Feb., Mar., May, and Dec. 1893.

The All-Sufficiency of Natural Selection. A. WEISMANN. Contemporary Review, Aug. and Sept. 1893.

The history of biology during this century will be known in the next as marked by three great discussions relating to evolution. First, that between Cuvier and St. Hilaire, culminating in the famous debate in the French Academy in 1830, touching the methods of thought which were then leading to the discovery of the law. Second, that of 1858, caused by the revival of the law itself by Darwin and Wallace, and led by Huxley in England and Haeckel in Germany. Third, the present discussion which began in 1883, when Weismann first challenged the principle of Inheritance of Acquired Characters as a factor of evolution. This discussion probably culminates in the recent papers under review.

The supreme confidence of both parties is expressed in the titles of these papers—*The Inadequacy of 'Natural Selection,'* as Spencer's firm conclusion, is faced by *The All-Sufficiency of Natural Selection,* as Weismann's. The last word on each side is an unwavering confidence in the position originally taken, and a total rejection of the arguments advanced by the opposite side. Spencer's original article seemed so strong that his supporters in England imagined it would be conclusive, yet Weismann certainly gives an equally strong reply, bringing forward as a new and apparently irrefutable argument the case of the evolution of the neuter insects, in which most marvellous adaptations appear, for which the Lamarckian explanation cannot be advanced, because these insects leave no descendants. Yet in Spencer's rejoinder this argument is met in the most clever manner, by the assumption that these adaptations in sexless forms were established in the earlier social states of ants, bees, and wasps before they became sexless and while acquired characters could still be transmitted. In short, this discussion leaves every reader exactly where it finds him, because the honors in logic are evenly divided. Both sides are strong in attack and weak in defence.

While inconclusive it is most stimulating and has attracted wide attention, because the question bears with equal force upon problems of ethics and psychology as upon all lines of biological thought which run in the direction of the life-histories of organisms lower than man.

To no one is the issue so vital as to these two famous disputants. With Spencer we may say his whole system is at stake, and the permanence of the philosophy to which he has given his life. Weismann has a sudden notoriety to lose and a permanent reputation to gain, because if he is in the right, as the first opponent of the Lamarckian principle of inheritance, and, with Wallace, the champion of the exclusive selection theory of evolution, he will go down to posterity as the greatest biological thinker of this century after Darwin. Now in the issue itself there is no half-way ground; the final result must be the total rout of one side or the other, and under such stress we should find in this discussion the strongest presentation possible of the two positions. This we do not find. It is the purpose of this review, therefore, not to follow arguments, which are so readily accessible and intelligible to all readers, but to show that the position of both Weismann and Spencer is defective—because neither has brought forward inductive evidence.

In fact, the reason these papers, interesting and able as they are, leave no final verdict in the mind is that neither meets the tests of scientific truth. When we look beneath the surface and recover from the first blinding effects of the brilliant style which characterizes both attack and reply, we see that both set forth mainly the modes in which nature may be supposed to act, rather than the mode in which nature does act. Nature, if anything, is illogical in many of her forms.

Weismann's strength lies in his exposure of the weakness of Spencer's position in relation to heredity. His weakness lies in the purely theoretical nature of the support of his own. He brings this charge against himself in the striking passage:

> "What is it then that nevertheless makes us believe in this progress as actual, and leads us to ascribe such extraordinary importance to it? *Nothing but the power of logic;** we must assume natural selection to be the principle of explanation of the metamorphoses, because all other apparent principles of explanation fail us, and it is inconceivable that there could be yet another capable of explaining the adaptations of organisms, *without assuming the help of a principle of design.* In other words, *it is the only conceivable natural explanation of organisms regarded as adaptations to conditions.*"

Have thirty-five years of research under the stimulus of the selection hypothesis failed to bring forth a single fact or group of facts which Weismann, as one of the best informed of all living naturalists, can cite? He could have made no stronger array of evidence against his cause than his dependence throughout these essays upon theoretical considerations in support of his position that the selection principle *acts upon any and every minute shade of character in the organism.*

* Italics are our own.

In the absence of fact, he presents the group of speculations which have grown up in the Neo-Darwinian school, namely: the refinement and apotheosis of selection; the utility or adaptiveness of, and intense premium upon, every variation; selection as a sustaining power; the cessation of selection or panmixia, and finally the reversal of selection:—all processes spun out of the human mind, without an iota of direct evidence in their favor.

This absence of evidence drives us to the conclusion that, so far as inductive proof is concerned, natural selection now stands, not as Darwin originally proposed it (in the extreme form revived by Weismann), but as Darwin left it in his later judgment, namely, as the arbiter of fitness in groups, species, varieties, individuals, and in single characters when they are of sufficient importance to weigh in the scale of survival.

When, however, we turn to Spencer as the champion of Lamarckism, we find him open to precisely the same criticism: he discusses probabilities rather than facts. This is partly because in the very broad field of science and philosophy which he has attempted to cover—so broad that in the present advanced state of knowledge one must sacrifice depth to breadth in the attempt—he has not kept pace with the progress of biology. His standpoint is exactly similar to that of his *Principles of Biology* published many years ago, and of his more recent essay *Factors of Organic Evolution.* This pardonable unfamiliarity with recent work is the apparent cause of his failure to give his attack upon Weismann the inductive basis, which was within his reach; but more than this it has led him to a statement of his position which is absolutely fatal to his whole case and which Weismann has surprisingly overlooked. It occurs in the conclusion of his first article:

> "See, then, how the case stands. Natural selection, or survival of the fittest, is almost exclusively operative throughout the vegetal world and throughout the lower animal world, characterized by relative passivity. But with the ascent to higher types of animals, its effects are in increasing degrees involved with those produced by inheritance of acquired characters; until, in animals of complex structures, inheritance of acquired characters becomes an important, if not the chief, cause of evolution."

Now the reverse of this principle is established by the researches of recent embryology; for, as the physical and mechanical basis of inheritance has now proved to be the same from the lowest to the highest organisms, the transmission of acquired characters must either extend from the lowest to the highest, or, as Weismann believes, it must diminish from the lowest to the highest. When Spencer says that this transmission increases towards the highest organisms he is not only

wrong in his facts but he cedes the case to Weismann, for adaptations in plants and in lower organisms are precisely the same in kind as those in the higher and the law of heredity must be the same.

The weakness in Spencer's attack on evolution by selection exclusively is further seen in his failure to take advantage of the evidence afforded by palæontology and by human anatomy that the fundamental postulate of the selectionists that adaptive structures arise out of the fortuitous play of adaptive and non-adaptive variations is negatived by direct evidence to the contrary. Palæontology shows conclusively that there is an adaptive trend in variation under the operation of some law; whether this is the Lamarckian law or some unknown law remains to be determined.

This discussion, at least in its theoretical phase, has reached its climax in this controversy. It must now enter the new phase of test by induction. Theoretically the subject is talked out, and Spencer and Weismann render their chief service in showing that ingenuity and logic on the two sides can be so evenly arrayed against each other. It is evident to the few biologists who have been able to keep cool in this heated period that we must now suspend speculation and turn to the more exact methods of science. The reaction towards the inductive tests of the problem is already well under way.

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HYSTERIA, ALTERNATING PERSONALITY, PARAMNESIA, THOUGHT-TRANSFERENCE.

Histoire d'une Idée Fixe. PIERRE JANET. Revue Philosophique, XXXVII. 121–168. Feb. 1894.

In this article Janet gives another of his monographic studies of the 'hysteric' condition. The patient was a woman of forty, of psychopathic heredity, who from early childhood had had fears and spasmodic attacks, and who, at the age of 17, in consequence of having assisted at the 'laying out' of two cholera patients, was seized with a haunting fear of this disease, which in three years made of her a wreck. Her worst feature consisted in frequent convulsive attacks of dread of the cholera, with vomiting, purging, and hallucinations of every sense. This condition had already lasted twenty years when Janet first saw the patient. The treatment consisted first in altering, by suggestions made during the attacks, now one and then another element of the terrifying hallucinations, until their whole character was changed. This cured the attacks; but the original state of waking *choleraphobia* returned.

M. Janet found that the nucleus of this emotion was the insistent presence of the *word* 'cholera' on the lips, as a phenomenon of motor automatism. He soon transformed the obsessive word as he had transformed the more complete hallucinations of the attack, by substituting other syllables, making chocolate, coqueluche, cocoriko, etc. The chronic state of fear departed with the dreadful word; but all sorts of other morbid ideas and impulses then showed themselves, partly due to accidental suggestions, and each easily cured by counter-suggestion, but each presently succeeded by another, so that the woman's condition remained on the whole deplorably abnormal. From this state of suggestibility, aboulia, and scatter-wittedness he rescued her by a year of pedagogic training, gymnastic and intellectual. His patience must have been great, for the whole narrative of treatment covers three years.—The article is full of acute psychology, e.g., the remarks on the nature of an 'idea' on p. 126, and on the definition of 'suggestion' on p. 141, and is of course most instructive practically.

Duplex Personality. R. Osgood Mason. Journal of Nervous and Mental Disease, xviii. 593–598. 1893.

The case has been ten years under Dr. Mason's observation, the primary personality being a young neurasthenic woman, thoughtful, dignified, and exhausted by much suffering. The second personality, which first supervened spontaneously after a syncope when she was 24 years old, was that of a sprightly child with a limited and quaint vocabulary, free from pain, able to take food, and fairly strong. Its visits came at intervals through several years, and lasted from a few hours to several days. During these years the patient, whose health had improved, got married. Later 'Twooey' announced one day that she never should return, but that another visitor would take her place. Accordingly, after a syncope of several hours, a third personality calling itself 'the Boy' supervened, serious and more like the primary self in character. The second and third selves had less acquired knowledge than the first one. Neither of the two former seems to have had memory or other direct knowledge of the other. But 'the Boy' seems to be directly aware of both the preceding selves [?]. They all know about each other by hearsay, however, and 'Twooey' and 'the Boy' have been very anxious to make 'Number One' well. 'The Boy' has sometimes lasted for weeks. 'Number One' seems to have had phenomena resembling clairvoyance; 'Twooey' to have shown 'sagacity amounting almost to prevision'; 'the Boy' to have exhibited 'peculiar perceptive powers' (reading what people said by watching their lips, when stone-deaf).—The case would seem to deserve a fuller account than the rather provokingly incomplete one which the writer gives.

La reconnaissance des phénomènes nouveaux. B. BOURDON. Rev. Philosophique, XXXVI. 629–631. Dec. 1893.

M. Bourdon pronounces series of letters or of words before a subject who is required to say when he recognizes one that has already been pronounced. Errors are not infrequent: a word will be recognized as recurring which only *resembles* a previous word, and sometimes it will even be so recognized when no word that resembles it has gone before. The author concludes that the mysterious sense of 'having had the same experience before' is an error of identification. The present is judged the same with some more or less resembling real past, whose points of difference are overlooked, and the telepathic hypothesis of Lalande (see report *supra*, p. 94) is unnecessary.

A propos de la paramnésie. J. LE LORRAIN. *Ibid.* XXXVII. 208–210. Feb. 1894.

M. Le Lorrain maintains the same conclusion. The mysterious sense of having previously experienced the same is a real recollection, either of some merely similar experience, or of an identical experience unnoticed at the time but registered subconsciously. The resurrection of the thitherto subconscious record gives (apparently) the emotion of mystery to the phenomenon.

The Annales des Sciences Psychiques for Sept.–Oct. 1893 contains three articles on thought-transference.

Dr. Dariex, being in another part of Paris from a cancer-patient whose sufferings he was relieving by hypnotism, mentally willed that she should sleep. Three times running she fell asleep at the time when he was exerting the volition. The fourth time the effect was less complete; the fifth time there was no effect, but the conditions were here different, and the author inclines to admit that the first four experiments were probably cases of cause and effect.

Dr. Tolosa-Latour, who was treating a hysterical patient by hypnotism, relates how, one day, whilst in a railway-carriage in France, she being at Madrid, he willed that she should have a convulsive attack [!!!], which she had with great severity at about the same hour, such attacks being at that time rare in her experience.

Professor Tamburini reviews Gurney's 'Phantasms of the Living' at considerable length, concluding that the subject of veridical hallucinations merits the most careful study. The 'telepathic' hypothesis of their production supposes that a stimulus starting from the distant agent's mind impresses the mind of the seer, not necessarily with the content of the agent's consciousness, as in thought-transference, but often with another idea altogether. [Thus agent, whilst dying, has his

mind filled with images of seer's person, but seer has a vision of agent's person, not of his own.] T. seeks to diminish this paradox by recalling those illusions in which the object perceived is unlike the stimulus, as when a noise made by birds will be heard as human speech. The most original part of the article is a suggestion that if the word telepathy do denote a real process in nature, it may be a process obtaining between different portions of one and the same brain, and that thus the train of our ideas may be partly determined by a sort of factor of which no account has yet been taken.—The author includes or appends eight unpublished cases of veridical hallucination, dream, or impression, one of them relating to a shipwreck, the seven others to as many deaths. W. J.

Les phénomènes de synopsie (*audition colorée*). CH. FLOURNOY. Paris, Alcan, 1893. pp. 259.

Under this title M. Flournoy gives the principal results of an investigation begun in February, 1892, by M. Claparède and himself. The data collected are gathered up in a theory of colored audition (*audition colorée*), which deserves careful examination.

I. As is always the case, the greater part of the 2600 question-papers sent out were never returned; some 700 were filled out, half of which described phenomena growing out of colored audition. Even if we reckon all that were lost as negative, these figures give one case of colored audition to every seven persons. Bleuler and Lehmann had found before one case in eight. It is probable that further research will show an even greater frequency of this phenomenon, formerly considered more exceptional. It would be desirable to find the ratio for certain classes in society. Flournoy attempted this for professors and students, but without success, as the public do not understand the importance of these investigations. *Per contra*, the author was able to verify several of the answers by direct questions and thus eliminate from them the uncertainties attached to information obtained by correspondence.

The material gathered together might be treated in two different ways: it might be simply tabulated, and the theory afterwards erected upon it; or the theory might be presented at once and verified by mixing in fragments of the observations. The writer has chosen the latter method; this has the effect of giving greater prominence to a theory; from other points of view one might have preferred to see the data thrown more in relief, and to have each observation preserve its

own characteristics without being cut off from the rest, or given piecemeal. Observations in many respects identical might have been superposed, as it were, so as to form groups which would be 'composite portraits' of various types of colored audition. This would not have overburdened the book, and each individual subject would have retained his physiognomy, his character, his type of mental imagery, which the reader would have been glad to examine in order. The author had all the data necessary for this, and readers will regret being deprived of them.

II. But these are criticisms of details. Let us pass to the work itself. As investigations of colored audition have increased in number, its domain has grown larger; to-day it includes various phenomena bearing merely a faint analogy to it. Still the terminology has been but slightly modified, often by chance alone, whence a confusion which Flournoy seeks to remedy by adopting a more precise vocabulary. If the word *synæsthesia* (*synesthésie*, *σὺν αἴσθησις*) denote well enough any association of different sensations, then *synopsia* (*synopsie*) would include such as rest on a visual basis. Cases of synopsia are divided in turn into: *photisms*, when a color is associated with a sound; *schemata* and *diagrams* (*schèmes* et *diagrammes*), when the phenomenon takes the form of a spatial representation realized at once or developing itself in series; *personification*, where the figures, etc., are represented in the form of persons.

Each of these phenomena may occur in varying degrees of intensity, from a mere thought (e.g., the logical schematism) up to an image localized and almost hallucinatory. The three classes may thus be developed and compared by a common formula. To render this comparison even more exact, the author advises us to distinguish in each case of synopsia between the *inducer* and the *induced*: the former determines the appearance of the latter, which is in some way within its sphere of attraction—'in its aureole.' This seems to us of particular importance to those who are endeavoring to find an objective sign of colored audition in the rapidity of association-time: it is not immaterial whether we associate the inducer with the induced, or the induced with the inducer. Such is the nomenclature proposed; the only question is whether the study of colored audition is far enough advanced for terms to remain without variation. If so, we believe it will be adopted, for it is very systematic.

III. Thus we find first of all *photisms*, the most typical phenomena of colored audition. Flournoy received specimens of every variety of it: the coloring of vowels and diphthongs, of consonants, words, and musical notes, of numbers, days, and even odors and tastes. He

observes, also, that certain subjects, who do not themselves 'color letters,' are annoyed at hearing such and such a color attributed to certain letters; this is less than the real 'colored audition' and more than philistine indifference. Flournoy calls it *negative photism.* The study of this type may help us to understand the coloring process in *positive* photisms. The utmost irregularity prevails in the coloring of these. Only the rule formerly found by Beaunis and Binet throws a little light upon the question: 'Of the vowels *i* and *a*, one is red, black, or white' about 95 times in 100.

The author appears to be more fortunate in his attempt to formulate what he calls the *law of brightness*, which he states as follows: 1. *i* and *e*—bright in a majority of cases. 2. *u* and *ou*—dark in a majority of cases. 3. *a* and *o*—medium, fluctuating between bright and dark.

This law is not sufficient to account for the coloring of vowels, but it reaches the principal factor, viz., light. It permits Flournoy to form, in accordance with the results of the principal investigations, a table of brightness together with a table of coloring, including the results of Fechner, Bleuler, Lehmann, and Claparède.

If we knew the law of coloring for vowels, we should have the law of their diphthongs also, for the one regulates the other; relying on this fact, the author is able to formulate these rules of coloring:

1. *Juxtaposition* of colors: *o* yellow, *a* black, *i* red, gives *oi* yellow and red.

2. *Optical mixing* of colors: *a* red, *i* blue, *e* white, gives *ai* violet.

3. *Adoption* of one of the component colors: *ai* white, from *i* red and *a* white.

Does the knowledge of the theory of complementary colors, etc., influence the manner in which the subject colors diphthongs? We have few details on this point. As to the coloring of consonants and figures, their laws are still more difficult to formulate than those of vowel-coloring.

Between photisms and schemata lies a distance such as separates a luminous sensation from a colorless representation. Flournoy distinguishes two kinds of schemata: the *diagram*, which unfolds itself in space, interpreting the sensations of changes experienced successively on reviewing a series; and the *symbol*, which interprets rather the entire impression of a single thing. Of these two the *diagram* is the more important and the more varied. The author has given several figures of numerical, weekly, annual, chronological, etc., *diagrams.* As in the case of photisms first in the series we find localized and almost objective *diagrams*, which impose themselves upon the subject; and farthest removed from them, on the other hand, are the *logical diagrams*, plastic,

modified by the possessor in conformity to his memory, or for fixing dates, abstract ideas, the figures in a calculation, etc. These are real mnemonic aids.* In a curious chapter full of ingenious views the author shows us next how these *diagrams* usually appear in childhood, develop until maturity, and sometimes disappear in old age. Finally the carefully-verified study of a family nearly all the members of which had such *diagrams* reveals the importance of heredity in these matters. This is unfortunately very meagre, and the author wishes it could have been more thorough. The *personifications* form the subject-matter of the final chapter—quite brief, since this phenomenon touches colored audition only at certain points.

IV. It remains to speak of the theory of these phenomena; it runs through the entire work, but is found especially at the beginning. It is well known that colored audition is dependent upon none of the 'classic' laws of association; still it occurs too frequently not to obey some law. Flournoy proposes three, but they are of unequal importance. There is first a *law of affective association*, which unites two sensations on account of analogy in their emotional character, even when their objective contents have nothing in common. They affect the organism similarly, and that is sufficient to unite them. Next comes the *law of habitual association*, binding together two heterogeneous sensations which habitually occur together. Lastly, the *law of opportune association* (*association privilégiée*) takes account of a host of connections which gain a footing in our mind at their first occurrence, because they come in at an opportune time.

We may pass rapidly over the second law, to which the author attaches little importance, and which derives its results from other laws,—for the frequent coming together of two sensations is not a matter of chance, but has a cause. This cause, when it is not one of the 'classic' laws, would be sometimes their identical emotional character (law of affective association), sometimes certain affinities which are still obscure (law of opportune association). To these obscure affinities Flournoy allows much less importance than to analogies of emotional character; yet they seem to cover an equal number of facts. In these affinities, sprung from the depths of our nature, where the past prepares them and calls them up, will be found the explanation of the artists' colored auditions. From this point of view they deserve to have indicated their important rôle in the psychical moulding of the child, as the author has done in a very happy, and we believe very

* It is rather curious to note that even the blind can make use of them. This fact is not the least striking of the surprises in an investigation on the *audition colorée* of the blind, the results of which the present reviewer hopes to publish shortly.

exact, manner. Still the chief principle in these associations is what Flournoy calls the identity of the affective coefficients. It is perfectly conceivable that two sensations absolutely heterogeneous and not admitting comparison of objective content (e.g., the color red and the sound *i*) may nevertheless admit of comparison and more or less resemble each other in their organic effects. This emotional factor which accompanies them becomes the bond of union between them. This is a very important point, and very well brought out by the author. Doubtless the proposed law is not yet so clear as future research will make it; it is still vague and quite general, for the data on colored audition are still insufficient. It shows indeed that bright colors in general unite with sounds of high pitch; but it does not show what color a given sound will choose. It also leaves untouched the question concerning the ultimate substratum of these associations. Are they of psychological or physiological origin? Most probably sometimes one, sometimes the other, according to the circumstances which give them birth. Nothing here is really established yet, as Flournoy warns us; the same must be said concerning the centre of such associations, the search for which is especially tempting to the psycho-physiologist, since he is here in the presence of a phenomenon which is the more conspicuous because it is not universal.

Flournoy merely notices these last two questions; he has, however, done his share to render their solution easier. His study, well furnished as it is with data and cleverly written, has the double merit of being at once pleasant reading and the work of an earnest psychologist.*

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VISION.

Studies of the Phenomena of Simultaneous Contrast-color; and on a Photometer for measuring the Intensities of Lights of Different Colors. A. M. MAYER. Am. Jour. of Science, XLVI. 1–22. 1893.

Prof. Mayer obtains the colored shadow effect by means of a screen composed of an inner disk of thick white cardboard and an outer disk of translucent white paper, which is illuminated on one side by lamplight (to which different colors may be given by colored glass) and on the other by daylight. By this arrangement, the contrast-colors obtained are so saturated as to cause astonishment even in those who are familiar with similar experiments. The colors were matched upon the color-wheel, being brought close to it by mirrors, and it was found that the petroleum flame of a Belgian burner was matched by a mixture of

* Translated by H. C. Warren, Instructor in Psychology, Princeton.

chrome yellow and red lead with twenty per cent of white, and its contrast-blue by Prussian blue and a little green with thirty per cent of white. (The contrast-color was therefore, roughly speaking, quite as saturated as the actual orange-yellow.) The matched colors thus obtained were then combined upon the color-wheel, and found to be, sufficiently nearly, complementary. To show that the original colors are complementary, the following experiment was made. A grating composed of alternate strips of cardboard and of translucent white paper of equal width was illuminated on one side by lamplight and on the other by daylight, and then looked at through a calc-spar prism, which was rotated "till the blue bands of the grating are superposed on the orange bands, when, if the surface of the grating is equally spaced, the superposed surfaces appear white when compared with the white of the screen, W. Without the screen, the eye has no term of comparison and may take a yellowish white for white." But this experiment seems open to objection. The contrast-blue is not a color that has any objective existence—it is only produced upon the retina as a side effect of yellow; it cannot therefore be moved about by a calc-spar prism. What happens objectively, before any image has reached the eye, is that the yellow strips are exactly superposed upon the white strips; an even surface of yellowish white is therefore what throws its image upon the retina. There is no possibility of the production of any other color-sensation,—neither a real (strong) yellow nor a contrast-blue,—unless in the two end bands, which are seen singly. That the intervening portion looked purely white must therefore have been due to some other cause,—possibly to some judgment-illusion produced by the yellow and blue (?) end bands. Experiments were made to determine the time required for the simultaneous contrast-colors to be produced. The electric flash of a Holtz machine was seen reflected from the first and from the second surface of a piece of green glass; the latter image was green (being formed by light which had gone twice through the thickness of the glass), and the former showed a contrast-red. The interval between the flash and the perception of the colors was less than $\frac{1}{15}$ of a second; "on viewing the flash and the illuminated surfaces [of a similar experiment] at the same time, *no interval could be detected* by this mode of observation as existing between the instant of the flash and the perception of the colors, and we certainly could have detected a shorter interval than $\frac{1}{15}$ of a second had it existed." This interval of time is evidently too short for the observer to exercise his judgment and divide between the two images a difference of color which is in reality only a departure from white on the part of one of them, as the psychical explanation of the phenomenon would require

him to do. There can therefore be no doubt (as has been shown before in many other ways) that what is called simultaneous contrast is a sensation due to an actual physiological process in the visual substance, and not to an error of judgment. This is a question of fact; Helmholtz has believed that it is an affair of the judgment, and Hering has believed that it is not, and it now appears that Hering is in the right. But fairness requires one to point out that Helmholtz' theory of color-sensation does not necessarily stand nor fall with his explanation of contrast; though Helmholtz himself, of course, does not yet find it necessary to take refuge in this fact, and it is quite possible that he would consider his judgment-illusions an integral part of his theory. Prof. Mayer says: "According to Hering's hypothesis of color-sensations, when a portion of the retina is stimulated, adjoining portions of the field of view are affected by a sort of inductive action; so that changes are produced which are antagonistic or complementary to those portions of the retina actually stimulated." But it is open to Helmholtz, if once he were convinced of the fact, to say the same thing, in the very same words. The changes in question can only be produced through the intervention of reflex nervous action, on Hering's theory; and by that means one process can be produced in the adjoining portion of the retina as well as another. If on any theory the sensation of yellow were due to a vibration of nerve-fibres to the east, then an induced sensation of blue could be accounted for as a vibration of nerve-fibres to the west; and this would be no harder for reflex nervous action to accomplish than a change in assimilation or in dissimilation. Hering has done much to establish the theory—it is almost better to say the fact—that contrast is of a physiological nature; and Prof. Mayer has here added important confirmation to his proof. But one should be on the guard against supposing that this is any confirmation of his theory as a whole. Prof. Mayer himself points out that the process induced in the adjoining portion of the retina may just as well be a complementary process as an antagonistic one.

BALTIMORE. C. L. FRANKLIN.

Theorie des Farbensehens. H. EBBINGHAUS. Zeitsch. f. Psychol., vol. v. 145–238. May 1893.

When Professor v. Helmholtz published the first edition of his *Physiologische Optik* in 1867, the theory of color-vision there developed represented the most advanced science. Now when the second edition is in course of publication the theory is antiquated. Nothing could bear more notable witness to the advance of science. The Young-Helmholtz theory of color-vision is pre-evolutionary and pre-psycho-

logical. The theory is pre-evolutionary because we must believe that in the animal series the discrimination of light and darkness preceded the perception of color. It is absurd to require three kinds of fibres and the like of the protozoa. The theory is pre-psychological partly because the special facts discovered or elaborated since 1867 cannot be adjusted to it, partly because the assumption that sensations of red and green or yellow and blue may be judged white is not now admissible. Professor Hering in 1874 saw the failure of the Young-Helmholtz theory in these two directions, and in a somewhat fragmentary fashion has developed one much more adequate. But the further progress of physiology and psychology has made the assumptions of Hering unlikely, and the newer facts do not fit naturally into his theory.

New theories have naturally resulted, and one advocated by the authority and ability of Professor Ebbinghaus deserves especial attention. Ebbinghaus begins with a searching criticism of the theories of v. Helmholtz and Hering. Against the Young-Helmholtz theory he points out especially the destructive testimony of the colorless spectrum of the completely color-blind and of the normal eye with faint illumination. He also notices the failure of the more exact color-equations of König and Dieterici to coincide with the requirements of the theory. Against the theory of Hering he adduces experiments of his own, showing that the intensities of grays of different composition do not remain the same when the illumination is altered. Mrs. Franklin has also made this observation with pigments, and indeed it must be evident to any one who has made color-equations. The writer has known for many years that when an equation has been made for a given illumination both intensity and color become different when the illumination is altered, and this would indeed seem to be a necessary consequence of the Purkinje phenomenon described in 1825. Ebbinghaus also points out the difficulty in the way of assuming antagonistic processes of assimilation and dissimilation, and the failure of Hering's theory to account for the types of color-blindness.

Ebbinghaus then proceeds to develop his own hypothesis. He identifies the visual purple or rod-pigment (Franklin's preferable name) of the retina with the 'blue-yellow' substance of Hering, and assumes another pigment ('red-green') complementary in objective color and present only in the cones—whence their lack of color. A third 'white' substance, present throughout the retina, is not objectively visible. The dissimilation of the last-mentioned substance gives the white and gray sensations. These also accompany dissimilation of the other two substances, but such dissimilation is in addition accompanied by sensations of color. In the case of the 'blue-yellow' substance (the rod-

pigment), for example, the first part of the process of dissimilation gives rise to the sensation of yellow and its final destruction to blue.

Ebbinghaus thus follows Donders (whose theory he does not mention) in substituting partial decomposition of the visual substances for the antagonistic processes of dissimilation and assimilation assumed by Hering. The supposition that sensations accompany processes of assimilation is certainly unlikely; at the same time it must be allowed that this assumption does account for the neutralization of complementary colors, whereas Ebbinghaus simply states that 'sie haben etwas Antagonistisches und stören sich gegenseitig.' His theory like that of v. Helmholtz exactly fails to explain the fact which makes a theory necessary. It is certainly an advantage to identify the hypothetical visual substance with a real physiological substance, but it seems that the alterations in sensation scarcely correspond with the known reactions of the rod-pigment. The correspondence of the objective colors of the rod-pigment with the complementary colors in sensation is not exact, and is more specious than convincing. Ebbinghaus' theory fits better than Hering's with the facts of intensity and color-blindness, but when Hering is convinced of the facts he can readily adjust his theory.

This short notice cannot do justice to the careful working out of the details of criticism and construction which Ebbinghaus accomplishes with German thoroughness and German 'leisureliness.' The writer must, however, admit that he finds the theory less satisfactory than those of Wundt, Donders, and Franklin. It should be remembered that in all cases assumptions are made which must be verified by physiological research. All recent theories are, in spite of their names, not theories of color-vision, but hypotheses concerning the physiological processes which precede vision. So long as we are ignorant of these actual physiological processes the writer finds most satisfaction in assuming that the continuity of physical vibration is transmitted through the retina to the brain, where inertia, summation, and inhibition intervene to produce the changes which are correlated with consciousness. J. McK. C.

THE SENSE OF TOUCH.

An Experimental Study of Simultaneous Stimulations of the Sense of Touch. WILLIAM O. KROHN. Jour. of Nervous and Mental Disease. March 1893.

The writer, in connection with Mr. Bolton of Clark University, performed a series of experiments "to determine the relative sensitive-

ness of different portions of the skin, to find the nature and direction of the errors in localization, and to study the influence of attention upon the localization and interpretation of the simultaneous touch stimulations." An investigation of the interesting problem of attention was also made, with especial reference to the question of how many sensations of touch the mind can attend to or grasp at one time. The effect of practice was also carefully examined. The touch stimuli were applied by means of small cork points attached to adjustable tambours, which were connected with a common air-chamber by means of separate pipes. Pressure brought to bear upon the confined air in the chamber caused the cork tips to touch the skin at various parts of the body synchronously, or practically so. Altogether about 2500 tests were made, perhaps the larger number upon students at the University of Illinois.

The following conclusions are substantiated as a result of these experiments. It was shown: (1) that the skin over the joints is more sensitive than elsewhere, permitting greater accuracy of localization; (2) that touches on the back are more distinctly felt, more clearly remembered, and therefore better localized than touches on the front of the body; (3) that on the left side touches are not so well localized as on the right side; (4) that localizations are more correct when the touches occur at points removed from the median line—touches on the median line being very poorly located; (5) that exposed surfaces localize better than portions usually covered with clothing; (6) that piliferous parts are more sensitive; (7) that errors in localization follow certain fixed rules; (8) that the influence of attention is very marked; (9) that the effect of practice is plainly shown; (10) that two pressure stimulations are often fused into *one single sensation*, localized at a point removed from either of those at which the stimulations were received; (11) that there is a strong tendency to perceive dermal sensations of purely subjective origin; (12) that bilateral asymmetry of function is plainly evident in dermal sensations. These experiments have opened a new and interesting field.

AUTHOR'S ABSTRACT.

EXPERIMENTAL.

An Experimental Study of Some of the Conditions of Mental Activity. JOHN A. BERGSTRÖM. Am. Jour. Psychology, VI. 247–274. Jan. 1894.

Mr. Bergström's study is excellent reading for those who credit experimental psychologists with an overweening desire 'to make the

facts agree with their theories,' since the thoroughness of the investigation is no more marked than the modest conservatism of the conclusions. The problem was the discovery of the 'natural rhythm,' if there be one, of mental processes. The method consisted in the accurate timing of definite intellectual operations at different periods, about two hours apart, throughout the day and evening. The results, which are given in tabulated and in graphic form, include experiments on seven subjects of whom five were connected with the psychological department of Clark University: in all cases the daily routine was similar. The tested process, except in the case of one subject, consisted, in the first experiments, in sorting a pack of eighty cards, of eight distinct sorts, into ten piles. The experiments were continued through 17, 11, 11, 10, 8, and 5 days respectively, for different subjects; they certainly show the existence of a 'natural rhythm' of mental activity, but the periodicity is individual, not general. The most constant factor is the depression, shown by all the records except one, from morning to night. In the case of two subjects, Mr. Bergström compares the relative variation of different processes: reading, adding and multiplying numbers, and learning nonsense-syllables. The experiments show very slight changes, at different hours, for the simpler processes, and very striking variations for the more complex. Thus the mean averages of each test are 1.02, 1.55, 2.37, and 7.95 seconds respectively for the operations just named. A comparison of the 6 P.M. records after 'exciting physical exercise' with those taken at 4 P.M. shows, in general, a relative stimulation of the simpler processes but, in most cases, a depression of the more difficult: in the records taken after walking, the difference is seldom observed. An observation of the rapidity of the pulse-rate, in connection with the different records, shows in one case a change from 71.3 to 53, while there was no change in the rate of the mental processes, so that 'mental activity can evidently not be said to vary with the pulse-rate.'

In the second part of his paper Mr. Bergström tabulates and slightly enlarges the results of his earlier study (*Am. Jour. Psych.*, v. 3), and indicates the evident influence of the interference of associations, as shown in the averages of Ebbinghaus, for his eight memory-series, 105, 140, 142, 146, 146, 148, 144, 140 seconds. 'The great increase of the second above the first and the slight difference afterwards' accords exactly with Mr. Bergström's results, and is explained through the facts that the first series is always best learned, and that the effect of practice later counterbalances that of interference. In conclusion Mr. Bergström considers cases of 'surprising retardation' in thought, such as persisting errors, and emphasizes the prominence of interference as

an influence which hinders mental processes, and the significance of the inevitable decrease of interference as a negative explanation of the reassertion of the mental energy. The theory is not put forth as a complete one, but it is certainly far more credible than the usual hypotheses which attribute the recovery of the correct associations 'to unconscious cerebration, to summation of stimuli, or to rest.'

MARY WHITON CALKINS.

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MEMORY, IMAGINATION.

1. *La Mémoire des Joueurs d'Échecs qui jouent sans voir.* A. BINET.
2. *La Psychologie des Auteurs Dramatiques.* A. BINET et JACQUES PASSY. Revue Philosophique, Feb. 1894, 222–240.

1. M. Binet, in announcing a forthcoming work on cases of extraordinary memory, reports as a specimen and as typical of the class to which they belong, the experiences of Dr. Tarrasch. T. plays from six to eight games at a time without sight of the board, and he here tells how he does it. His main reliance is on a very vivid imagination of the board and of the arrangement of the men. The board, which is persistently present during the play, is visualized in a small diagram of about 8 cm square, with the squares light and dark ; the men are visualized with something of color and form, but with no regard whatever to material. Next in importance is the power to recall the progress of the game, and here the memory is greatly aided in the case of a good game by the logical order of events. A third factor is the memory of words, e.g. of the judgments interiorly formulated at different points concerning the character of the play. The main thing in playing several games at once is to keep the games distinct. When the opponent's move for a particular game is first announced, it is often found necessary to recall deliberately how that game opened and to trace its history in detail to the point where the stated move becomes significant ; but as the games develop they get more clearly differentiated and such detailed reproduction becomes unnecessary. T. seems to have a good but nowise remarkable general memory ; in mental arithmetic he reports himself as distinctly deficient.

2. The second article, designated as a study of the conditions of creative imagination, deals principally with the experiences of a comparatively new author, M. de Curel. M. de Curel's method is to invent a situation suggesting a problem, and then to proceed at once to composition. The problem is not worked out logically, but the play grows by a sort of 'crystallization': the original situation becomes very

likely changed in character and dramatic value, and the psychology only appears as an 'extract' from the facts. The author writes rapidly, the average time for a play being about three weeks. While composing, he hears his personages rather than sees them, having an especially vivid impression of the inflections of their voices as revelations of their character; the scenes are those of real life, not those of representation on the stage. The most interesting feature of the author's state of mind while composing . its pronounced duality (*dédoublement*), approaching the morbid type. At first he is distinctly conscious of inventing his personages, and is interested in them and their fortunes; later he becomes personally indifferent to their fortunes, the characters are formed as it were within him, and express *themselves*, so far as their sentiments are concerned, while he, the author, maintains voluntary control of all the rest. As he himself puts it, he is for the time being 'completely in their skin,' his pen is, in a manner, 'moved' by them, and even when writing is interrupted by a visit or conversation, the work of composition still goes on, 'because the interior personage continues his office.' The writers of the article find that M. de Curel alone of all the dramatists they have consulted exhibits this duality of consciousness in this form. They designate it as *dédoublement réel* as distinguished from *dédoublement littéraire* (where the author tries to obtain himself the sentiments of his characters in order to put them, with conscious art, into their mouths), and are surprised to find this mental 'disaggregation,' which French psychologists have hitherto regarded as a symptom of weakness, in an author of such power. The investigation is worth continuing. The present writer knows of at least one novelist with whom something of the same sort happens, and is inclined to suspect that, allowing for some exaggeration in description, the phenomenon is not so altogether uncommon. Even M. de Curel is not completely possessed by his imaginary personages, for he admits that sometimes he mingles his sentiments with theirs and is obliged later to make the necessary corrections.

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RHYTHM.

Rhythm. THADDEUS L. BOLTON. American Journal of Psychology, VI. 145–238. Jan. 1894.

About one third of this paper is devoted to a review of the rhythmic processes discernible in nature both inorganic and organic, and of their artistic application in music and poetry, with special reference to

English verse of which several philosophies are cited. In the experimental investigation which follows, an attempt is made "to reduce rhythm to a more fundamental activity of mind." This task involves the solution of various problems, the first of which is to determine what the mind does with a series of simple auditory impressions absolutely uniform in intensity, pitch, quality, and time-interval. Such sounds are obtained from the telephone connected in an induction circuit, provided the primary circuit be broken at regular intervals when the secondary is closed, the secondary being open when the primary is closed. The breaks were effected by five arms fixed on the drum-shaft of a Wundt chronograph and playing upon ten keys, which, when pressed down, closed first the primary and then the secondary circuit. By properly arranging the arms and using extra coils, a more intense click could be thrown in at will.

"The subject was requested to group the sounds, not by voluntary effort, but only so far as it was found easy and spontaneous." The records of thirty observers are given, most of whom had some musical talent and training. A detailed protocol shows the effect of the click-intervals upon the grouping, and the various images suggested by the sounds. These interesting accounts would perhaps be easier to compare if the same intervals had been used for all the subjects. Wundt's statement that it is impossible to restrain the grouping absolutely is disproved by these results and explained by the variations in the metronome-beats which Dietze employed. On both points the author agrees with Schumann, though no reference is made to the Schumann-Wundt discussion. The conclusion drawn from the observations is that rhythmical grouping results from a sequence of acts of attention, in each of which the auditory impressions are so subordinated as to form a unit in consciousness.

In determining the essential conditions for constituting this unity, the first step was to ascertain how many sounds might be grouped. One test was the ease and pleasure which the subject felt in grouping. It was found that rhythmical grouping takes place between a lower limit of 1.58 sec. and an upper limit of about 0.115 sec. In nearly all the subjects there was a tendency to group by fours, the average length of the 4-group being 1.228 sec. For the 8-group, which was the highest tested, the average length was 1.16 sec.

A second test was applied by giving, at different rates, first a series of uniform clicks, then a series in which every sixth click was accented, and finally one in which every eighth click was accented. The results agree closely with those obtained by the other test, and accentuation seems to make little or no difference. Comparison, however, of the

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tables is not entirely satisfactory, as the record is complete for one subject only.

The inherent nature of a rhythmical group was investigated by three methods. In the first place, the subject was asked how he grouped sounds of uniform intensity, and upon what sounds the accent, if any, was placed. The answers showed that in the 2-group the first sound was accented, and in the 3-group and 4-group the first and third sounds. In this case the first was stronger than the third. When a certain grouping was suggested, any other was found difficult or impossible.

By the second method, a regularly recurrent set of sounds of different intensities was given, in order to see where the mind would most naturally divide them into rhythmical groups. Experiment proved that as a rule the group must have either a strong sound at the beginning or a weak one at the end ; but certain arrangements of the sounds conflict with this principle.

The third method, employed with special reference to poetical rhythms, consisted in varying the length of the sounds. By rotating a notched disk between a tuning-fork and its resonator, regular interruptions were secured, the length of the sounds depending on the number of degrees covered by the notches. It was found that the longer sound, the most important element in the group, comes last, just as the most common foot in modern poetry is accented on the final syllable.

The muscular movements and the associations which most observers noticed are, with Ribot, regarded as the conditions, not as the results, of rhythmical grouping. The pleasurable feelings that accompany certain intervals are due to the fact that the length of the group corresponds to the normal wave of attention. If the rate be much faster or much slower than this normal, there is neither pleasure nor organic unity.

The general principle is thus stated : " The conception of a rhythm demands a perfectly regular sequence of impressions within the limits of about 1.0 sec. and 0.1 sec. A member of the sequence may contain one or more simple impressions. If there are a number of impressions, they may stand in any order of arrangement, or even in a state of confusion, but each member of the sequence must be exactly the same in the arrangement of its elements."

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LOGICAL.

Jugement et Ressemblance. V. EGGER. Rev. Philos., XVIII An., Nos. 8 et 9. 1893.

All judgments are reducible to statements of identity, not to concepts. The concept does not contain the duplication that the statement of identity involves. Accordingly the commonly accepted theory is wrong in regarding judgments as analytical in the sense of being analyses of concepts. The concept does not contain the duplicating and identifying copula. The concept is but A, for example; the judgment is $A - A$, or A is A, or A is B, or A is $b + c$, B and $b + c$ simply being the analyzed A as attribute of itself. Of course the process of the concept is in the judgment, as from being a purely formal identification it passes into a definition; but the concept does not afford an adequate account of the identification itself.

Is the principle of identity *a priori?* Not at all. Psychology does not need even to harbor the Platonic realism that metaphysics exiled long ago. The natural forces of the mind, its most ordinary processes, offer a perfectly satisfactory explanation.

In children judgments exist as unexpressed associations. Adults supply the implied *is*. The copula only names the association, the resemblance becoming object of a special consciousness. Judgments are stated associations of things similar.

Judgments are never associations of things contiguous. Association by contiguity is not reducible to association by similarity. Contiguity in its proper character is without the *is;* it belongs wholly within the terms that the *is* unites; it is not an object of judgment, although it enters into thought as material of judgment. If objection be made that language, when similarity is really meant, uses some word of comparison, saying, not *A is B*, but *A is as B*, the obvious reply is that *A is B* includes *A is as B*, as the abstract includes the concrete, by having outgrown it.

As against Mill, whose 'verbal' and 'real' propositions are considered at length, we are told that judgment does not affirm of two terms in relation their relation; it affirms one term of another. A judgment of which the attribute or the subject is a relation is artificial. Mill, with his interest in induction, was too much of an artist. For him as for Hamilton propositions were only so many words; their conversion was only a purely verbal operation. Not relation, not contiguity, but similarity is the real object of the natural judgment.

Judgment develops psychologically in these stages: (1) Subject and

predicate both individual. *This is that.* But the *that* tends ever to become more general and abstract. Cf. the child's unexpressed association of two concrete, individual things. (2) Subject individual, or distributive, or collective, but always quantified; predicate, or attribute, abstract, not quantified. A substantive for subject, adjective for attribute. Cf. Aristotle's propositions; also the theory of Rémusat, who regarded subject and attribute irreducible. (3) Two substantives, second having place rather than rôle of attribute. Both subject and predicate quantified. Mathematical propositions, definitions. Cf. Hamilton. (4) Two attributes. Theoretically, neither term quantified. Cf. the propositions advocated by Stuart Mill, who tried to relegate quantification to the copula. Natural language does not recognize these propositions; they are contrary to the habits of the mind. Indeed, natural language recognizes judgment only as in the second and third stages.

The form in the third stage is really a return to the first. As to the distinction in consciousness between subject and attribute, a distinction that is sharpest in the second stage, the judgment, by bringing together the two extremes of thought, the subject as extensive with intension implicit and the predicate as intensive with extension implicit, only shows their psychological continuity. The judgment is language's way of representing the class, or concept, as *a collective idea becoming abstract*, language being able to express this becoming only through the use of the extremes.

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PATHOLOGICAL.

Zur Theorie der cerebralen Schreib- und Lesestörungen. R. SOMMER. Zeitsch. f. Psychol., v. 305–322. 1893.

Sommer observed a 60-year-old peasant, who a year and a half before had had an apoplectic attack with resulting paralysis of right arm and leg. Paralysis disappeared after two weeks. Loss of ability to recognize certain letters and words remained, other letters being permanently recognizable, and still others intermittently so. Sommer's chief conclusions from this case are these:

Ability to read cannot be explained as result of recognition of letters and ability to retain their sounds in memory. The combination of sound-series into words is a psychologically separate function, without, however, a separate brain-centre. Such combination depends possibly on the ability to think the sounds in succession so rapidly that they unite into a word. It occurs in case of partial letter-alexia that the letters which can be recognized cannot be written to dicta-

tion. On the other hand, in writing to dictation, characters can be produced which cannot be recognized in reading. Moreover, coupled with almost complete inability to write down letters to dictation occurs the ability to write certain connected words. This proves that the presence in consciousness of the sounds corresponding to the singly produced letters is not absolutely necessary. The writer takes occasion also to answer some criticisms of his recent 'Zur Psychologie der Sprache' (*Zeitsch. für Psych.* II. 143).

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NEW BOOKS.

Basal Concepts in Philosophy. A. T. ORMOND. New York, Scribners, 1894. Pp. viii, 308.

Practical Lessons in Psychology. WILLIAM O. KROHN. Chicago, The Werner Company, 1894. Pp. 402.

Geschichte der neueren deutschen Psychologie. I. Bd. Von Leibnitz bis Kant. MAX DESSOIR. Berlin, Duncker, 1894. M. 13.50.

Pleasure, Pain, and Æsthetics. HENRY RUTGERS MARSHALL. New York, Macmillan & Co., 1894. $3.

Art in Theory: an Introduction to the Study of Comparative Æsthetics. G. L. RAYMOND. New York, Putnams, 1894. Pp. xviii, 266.

Social Evolution. BENJAMIN KIDD. New York and London, Macmillan & Co., 1894. Pp. 348.

Some Applications of Logical and Psychological Principles to Grammar. PETER MAGNUS MAGNUSSON. Minneapolis, University of Minnesota, 1893. Pp. 125.

Les émules de Darwin. A. DE QUATREFAGES. Bibliothèque scient. internat., 2 vols. 1894.

Zur Analyse des Apperceptionsbegriffs. J. KODIS. Berlin, 1893.

L'action. Essai d'une critique de la vie et d'une science de la pratique. M. BLONDEL. Paris, Alcan, 1893. Pp. xxv, 495.

Les caractères. FR. PAULHAN. Paris, Alcan, 1894. Pp. xii, 274.

Hypnotismus und Suggestion. M. BENEDIKT. Wien, Breitenstein, 1894. M. 2.

NOTES.

Messrs. Macmillan & Co. have published *The Proceedings of the American Psychological Association* (29 pp., 25 cts.). This contains accounts of the Preliminary Meeting (1892) at Clark University, the First Annual Meeting (1892) at the University of Pennsylvania, and the Second Annual Meeting (1893) at Columbia College. The Proceedings include short abstracts of the papers read (twelve at the first

meeting and fifteen at the second), many of which have not as yet been published elsewhere.

The University Press of Columbia College will publish a series of contributions to Philosophy, Psychology, and Education under the editorial supervision of the instructors in the department. These contributions will consist of dissertations and monographs too long or too technical for publication in existing reviews.

Messrs. D. C. Heath & Co. have published part of a Laboratory Course in Psychology by Dr. SANFORD, Assistant Professor of Psychology in Clark University. The part issued (pp. 183) gives instructions for experiments on the senses with full bibliographies.

M. BINET announces the appearance next year of a new *Année Psychologique*, which will contain "*résumés* of psychological literature appearing in all countries during the year." The subscription (price 5 fr.) may be sent in advance to him at the *Laboratoire de psychologie, Sorbonne, Paris.*

M. BINET is also on the point of issuing (in April) an *Introduction à la psychologie expérimentale.*

Professor LLOYD MORGAN is preparing for the Contemporary Science Series a work entitled 'An Introduction to Comparative Psychology,' some extracts from which are included in an article in the April number of *The Monist.*

Professor JODL of the University of Prague announces a *Lehrbuch der Psychologie* to appear in 1895.

In January the first number of a new monthly, *Rivista di pedagogia e scienze affine*, was published by G. B. Paravia e Comp., Rome. The review is edited by Professor SERGI with the co-operation of the leading Italian writers on pedagogy.

Professor SERGI has in press a volume on *Pain and Pleasure*, which is the first part of a systematic treatise on psychology.

Professor LIPPS of Bonn has accepted a call to the chair at Munich vacated by the removal of Professor Stumpf to Berlin.

Professor PAULSEN has been promoted to a full professorship at Berlin, and Dr. KÜLPE to an assistant professorship at Leipzig.

The present number of THE PSYCHOLOGICAL REVIEW is somewhat enlarged. Between six and seven hundred pages will be printed annually, but the prompt publication of articles and reviews can be best secured by varying somewhat the size of the separate numbers.